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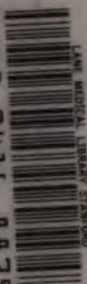
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A TREATISE
ON
GYNÆCOLOGY,
CLINICAL AND OPERATIVE.

LANGE

BY
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TREATISE ON GYNÆCOLOGY,

CLINICAL AND OPERATIVE.

BOOK X.

NEW GROWTHS ON THE UTERINE APPENDAGES AND LIGAMENTS (OVARIES, TUBES, BROAD LIGAMENTS, ROUND LIGAMENTS).

CHAPTER I.

PATHOLOGICAL ANATOMY OF OVARIAN CYSTS.

Classification of tumours of the ovary.—Pathological anatomy of ovarian cysts. *Classification.*—Large cysts. Size. External surface. Internal conformation. *Layers.* Internal surface. Epithelium.—Proligerous or proliferating glandular cysts.—Proligerous or proliferating papillary cysts. Histogenesis. Liquid contents.—Dermoid cysts. Mixed tumours. Origin.—Parovarian, hyaline, and papillary cysts.—Medium-sized cysts. Small residual cysts. Follicular cysts. Cystic disease of the ovary. Fibro-cystic change of the ovary. Cysts of the corpora lutea.—Tubo-ovarian cysts.—Pathological anatomy of the pedicle. Cysts enclosed in the broad ligament. Retro-peritoneal cysts. Adhesions: Ascites. Apoplexy. Suppuration. Twisting of the pedicle.—Peritoneal generalisation. Metastasis. (a) By spontaneous infection; (b) by operative infection.

FROM a histogenetic point of view tumours of the ovary have been divided into new growths of connective-tissue origin and new growths of epithelial origin. The first group, dermoid tumours, comprises fibromata, sarcomata, and myxomata, all of which are very rare, and particularly the last-named. The second group, epithelial tumours, comprises the cysts, carcinoma or alveolar epithelioma, and adenoma or mucoid epithelioma.

From a clinical point of view, the best division is into solid tumours and cystic tumours. The latter being infinitely the more common, deserve to receive the first attention of the practitioner.

Pathological anatomy of ovarian cysts.—Every portion of the tubo-ovarian apparatus may be the starting-point of cystic

formation; the cortical portion, and the medullary or parenchymatous portion, the lower border or hilum, the region between the tube and the ovary, where remnants of the Wolffian body are often to be found (Rosenmüller's body or the parovarium, hydatid of Morgagni, obliterated remains of Gärtner's canal). Essentially distinct from a histogenetic and anatomical point of



Fig. 337.—Vertical section of the ovary of a bitch (Wyder).

Over the whole of the free surface of the ovary is seen a layer of cylindrical epithelium cells (germinating epithelium [Keimepithel of the Germans]). At one spot there is a depression, like the finger of a glove, which thrusts a tube of this epithelium into the tissue of the ovary. Below is a layer of dense connective tissue, in which are seen young follicles and ovisacs. On the left, towards the middle of the section, are two follicles, somewhat older, with completely developed ovules. On the right is the stellate and folded cicatrix of an old follicle. In this region is also seen the stroma of the hilum, rich in vessels, and the transverse section of the tubes of the parovarium. The largest follicle, on the left, encloses two ovules, and allows of the recognition of the general structure of the follicles, fibrous membrane, granular membrane, and the proligerous disc with the ovule. In the latter are also to be distinguished the zona pellucida, the yolk, the germinating vesicle and its nucleolus.

view, these various new growths sometimes artificially range themselves in the same clinical variety; thus, to mention an example, the single fact that a cyst is enclosed in the broad ligament is sufficient to constitute it one of a very definite surgical class; now this enclosed cyst may have originated in

situ (unilocular cyst with limpid contents), or may have come either from the hilum of the ovary (papillary cyst) or from the parenchyma of the ovary (glandular cyst), and have inserted itself between the layers of the broad ligament by separating them.

From the point of view of anatomical description, it is necessary to distinguish cysts according to the sizes they may attain; there are some which never exceed a moderate size and may be unnoticed, or only give rise to symptoms which, although painful, do not compromise life itself. Others, on the contrary, grow with great rapidity from the time at which their development (the origin of which is sometimes lost in the embryonic period) commences to progress.

I shall classify ovarian cysts in the following manner:—

- | | | |
|-----------------------|---|--|
| A. Large cysts | { | I. Proligerous or proliferating glandular cysts. |
| | | II. Proligerous or proliferating papillary cysts. |
| | | III. Dermoid cysts, simple or mixed. |
| | | IV. Parovarian cysts, themselves comprising the varieties hyaline, papillary, and dermoid. |
| B. Medium-sized cysts | { | I. Small residual cysts (arising from the hydatid of Morgagni, or the horizontal parovarian duct). |
| | | II. Follicular cysts. |
| | | III. Cysts of the corpora lutea. |

Lastly, ovarian cysts may contract adhesions with the Fallopian tube and form a distinct variety, viz., tubo-ovarian cysts.

A. *Large cysts.* I. and II. *Proligerous or proliferating cysts.*—The appearance of these tumours is very variable; however, certain common characteristics allow of their receiving a general description, to which I shall afterwards add the special details relating to each variety.

The two ovaries may be affected, but the development in each is then not the same. Thus, while one side may be the seat of an enormous tumour, the other may show only a commencing change that scarcely increases its size. The surgeon must never

forget to examine carefully the ovary on the supposed healthy side before closing the abdomen. The volume may be such that the whole abdomen is filled,* the costal cartilages pressed back and everted in such a manner that after the tumour has been removed the woman suggests the appearance of a fish prepared for cooking.

The shape is approximately spherical or ovoid, but with bossy projections over the weak spots that have yielded more than others before the distension. In the places where the

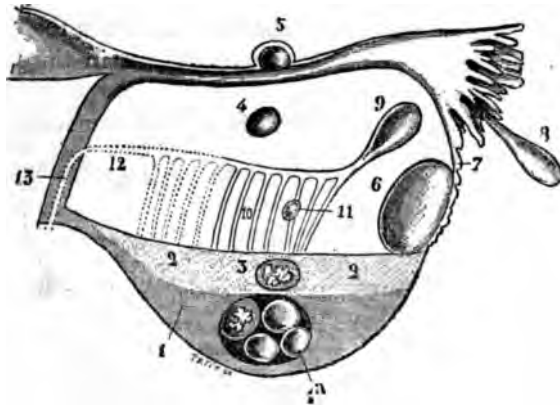


Fig. 338.—Scheme of the tubo-ovarian apparatus to show the diverse origins of cysts (Doran).

1a, glandular multilocular cyst developed in 1, the ovarian parenchyma; 3, papillary cyst developed in 2, the tissue of the hilum of the ovary; 4, unilocular cyst of the broad ligament independent of the parovarium, 10; 5, unilocular cyst of the broad ligament situated above the tube but in connection with it; 6, similar cyst situated quite close to 7, the tubo-ovarian ligament; 8, hydatid of Morgagni, which is never the starting-point of a large cyst; 9, cyst developed at the expense of a horizontal parovarian duct; 11, cyst developed at the expense of a vertical duct; these are the cysts that form the papillary cysts of the broad ligament (Doran); 12, 13, tract of the obliterated canal of Gärtner: papillary cysts may be developed along this tract (Coblentz), and would be the origin of papillary cysts in connection with the uterus, 13.

wall is thickest the colour is pearly or bluish white, marbled by the veins; in the thinner portions the colour is of a violet, green, or blackish colour, according to the nature of the contents. The external surface, smooth and oily to the touch, has sometimes scattered over it small papillary granulations resembling either frogs' spawn or the vegetations of certain

* N. Maglioni (*Historia de un quiste del ovario, &c.* Buenos-Ayres, 1891) removed from a woman, aged 65, a cyst, weighing 85 kilogrammes; the patient recovered.

mucous plaques. A retracted portion or pedicle generally supports the tumour.

The internal conformation varies greatly according to the number and the contents of the subsidiary cysts. Cruveilhier divided cysts into unilocular, multilocular, areolar, and composite. This division is not worth keeping, but it is useful for descriptive purposes to retain the terms areolar, unilocular, and multilocular.

The first, it is known, are due to the destruction of the



Fig. 339.—Glandular proliferating cyst of the ovary, of areolar appearance.

intermediate partitions, vestiges of which are found under the form of spurs or trabeculae. One sac is, as a rule, of predominant size, but sometimes there are two or three equally large. Side by side with cavities that contain several litres, are then found small cysts no larger than an orange or a walnut. At certain points, even the whole of a portion of the tumour may be formed by an agglomeration of very small cavities separated by a more or less dense, but sometimes gelatinous tissue, and giving on section the appearance of a honeycomb (fig. 339). In the so-called unilocular cysts, which surgically deserve the name, the anatomist almost always discovers a certain number of secondary cavities in the thickness of the cyst wall.

The cyst wall may often be divided into three distinct layers, principally near the pedicle; the external is fibrous, the middle composed of connective tissue, and the internal is formed by a capillary layer covered by epithelium. The veins, which are very large, perhaps equalling in size the femoral vein or even the inferior vena cava, wind over the external surface, and are adherent to it like venous sinuses, in consequence of which their wounding is very dangerous. Occasionally broad bands of smooth muscular tissue are seen spread over the tumour close to the pedicle.* The epithelium covering the external surface is cubical and different from the flat peritoneal epithelium.

The internal surface of cysts is covered by a very short cylindrical epithelium. Waldeyer describes one layer, Rindfleisch several. Malassez and de Sinéty[†] have insisted on its polymorphic characters. They discovered a sub-epithelial endothelial layer, and showed that in the same type of cysts the most varied forms of epithelium may be met with, irregular and superposed. They pointed out the importance of goblet-cells upon the viscosity of the liquid; and, lastly, they established a relationship between cells derived from the normal type as met with in cysts, or "metatypical" epithelium and that of glandular epitheliomata of the breast.

On making a section of the wall, depressions of the epithelial covering are found, giving the appearance of acinous glands with frequently constricted openings. On the internal surface also vegetations are found, formed by a proliferation of the stroma, the characters of which suggest myxoma or fibro-sarcoma; they are covered by a single layer of epithelium, and present a broken-up, dendritic appearance. Sometimes epithelial prolongations of tubular shape penetrate them from below upwards, and give them, on section, a carcinomatous appearance; small cysts may develop in these papillæ.‡ In spite of the hybrid forms that may thus be frequently constituted, it is of advantage,

* Lawson Tait (The pathological importance of the broad ligament, in *Edinb. Med. Journ.*, July, 1889, vol. 35, p. 97) has seen in a case of an enormous cyst enclosed between the layers of the broad ligament so thick a layer of smooth muscular tissue on the cyst wall, that the tumour resembled a gravid uterus.

† De Sinéty and Malassez. On the structure, origin, and development of cysts of the ovary (*Arch. de physiol.*, 1878, pp. 89 and 343; *ibid.*, 1879, p. 624; *ibid.*, 1880, p. 867; *ibid.*, 1881, p. 224).

‡ Olschansen. *Die Krankh. der Ovarien*, Stuttgart, 1886, p. 64.

following Waldeyer, to distinguish new growths in which the principal vegetation is of epithelial origin, and ends in the formation of glandular tubules (proliferating glandular cysts), from those in which it is principally the connective tissue of the cyst wall that develops and projects internally in the form of vegetations (proliferating papillary cysts). No doubt, as Quénu* has pointed out, in both cases there occurs the same process of proliferation, internal in the one case, external in the other; but the appearance of the new formation none the less undergoes a considerable change, according to whether the vitality of the epithelial element or that of the connective tissue element predominates.

Lastly, there exist cysts of mixed characters, being at once papillary and glandular. The proligerous or proliferating glandular cyst is characterised by the abundance of small glands in the cyst wall.

The glandular tubules of new formation become converted into cysts in the following way: their orifices, which used to open into the principal cystic cavity, become obstructed and obliterated; their blind extremity, infundibular in shape, then becomes dilated, and other glandular tubules are formed from it. These, in their turn, pass through a cystic phase, and terminate in giving rise to daughter glands. In consequence the multiplication of the glands becomes excessive.

The proligerous or proliferating papillary cyst shows indications of a predominating proliferation of connective tissue; the connective tissue forms buds that project into the cystic cavity, push the epithelium in front of them, and divide into slender papilliform branches. These dendritic excrescences may fill and distend the cyst until it gives way, and then project on the external surface either through a narrow crevice or through a large rent. The cyst may then seem to be turned inside out, its convex surface being covered with vegetations originating from the surface, and the whole appearance of the tumour being completely changed. At the same time its secretory products fall into the peritoneal cavity and lead to ascites, and the metastatic formation of disseminated papillary masses.

Tumours that have originated in this way have often been

* Quénu. Pathological anatomy of ovarian cysts other than dermoid. Thesis, Paris, 1881.

described as superficial papillomata* of the ovary, whereas really they originated from a cyst which has ruptured and disappeared. Nevertheless the vegetations may, apparently, arise directly from the surface of the ovary. Prochaska, Gusserow and Eberth, Birch-Hirschfeld, Marchand, Coblenz,† have related examples of this condition. But cases of this kind really ought to be described along with dehiscent cysts, and Coblenz's two cases plainly show this relationship. The ovarian stroma contained, in both cases, epithelial tubes in the way of becoming transformed into cystic cavities, and in the last case there even

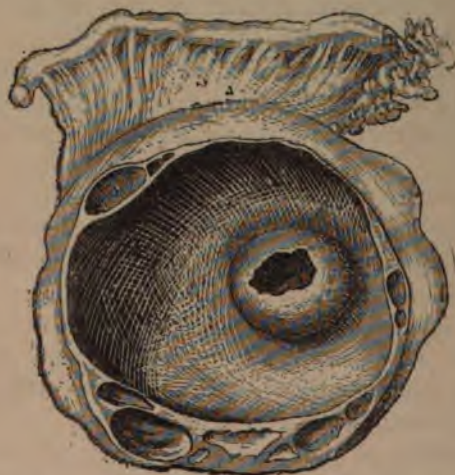


Fig. 340.—Small proliferating glandular cyst, multilocular (Doran).

The cut surface of the cyst wall shows secondary cysts; inside the cyst one of the secondary sacs is to be seen ruptured.

existed commencing formation of papillæ in the interior of these small cysts. Moreover, on the surface of the ovary, side by side with the large papillary mass, small vegetations might be seen, starting from depressions formed by ruptured superficial cysts. One is therefore justified in saying that the superficial papil-

* The word "papilloma" having already received a different histological significance is here badly chosen, and should only be used as a descriptive term, without any value in relation to histological classification. Terrier very justly pointed this out (Bull. et Mém. de la Soc. de Chir., 1886, vol. 12, p. 411).

† Coblenz. Das ovarial Papillom in pathologischer Anatomie und histogenetischer Beziehung (Virchow's Arch., 1880, vol. 82, p. 268).—Die papillären Adenokystomformen (Zeitschr. f. Geb. u. Gyn., 1882, vol. 7, p. 14).

loma of the ovary is itself nothing more than the product of the rupture of very small superficial papillary cysts. In this way, also, we get an explanation of the cases in which a papillary



Fig. 341.—Proliferating glandular cyst of the ovary (Wyder).

This figure is to show the origin of the multilocular proligerous glandular cyst at the expense of the glandular tubules of the ovary. Divided normal glandular tubules (of Pflüger) are to be seen. At other points (on the right and top of the figure) some of these tubules are already somewhat enlarged, approximated to one another and separated by a fine meshwork of connective tissue. One can also see how two cavities become fused into one cyst by the destruction of the intervening wall. On the left and above is seen, in a cavity of medium size, a strong spur, which is very probably a remnant of the intervening wall of two ovisacs that have undergone cystic degeneration. The lower portion of the figure is occupied by larger cavities with gentle depressions and elevations. The lining of the glandular tubules and the cysts resulting from their degeneration is a beautiful layer of columnar epithelium. Their contents have escaped owing to section; in one place only can a small cellular mass be recognised. The supporting meshwork is fibrous with a fairly large number of round and fusiform connective-tissue cells.

cyst has been found on one side and a papilloma of the ovary on the other.*

* W. Netzel. *Hygiea*, 1887, vol. 49, No. 3 (Anal. in *Centr. f. Gyn.*, 1887, No. 23, p. 369).

Papillary cysts are very often enclosed within the broad ligament, for they develop either from remnants of the Wolffian body or from the hilum of the ovary, or they penetrate these vestiges (Doran); thus, starting from the adherent edge of the ovary, the tumour naturally finds its way by development between the layers of the broad ligament. On account of its assuming this

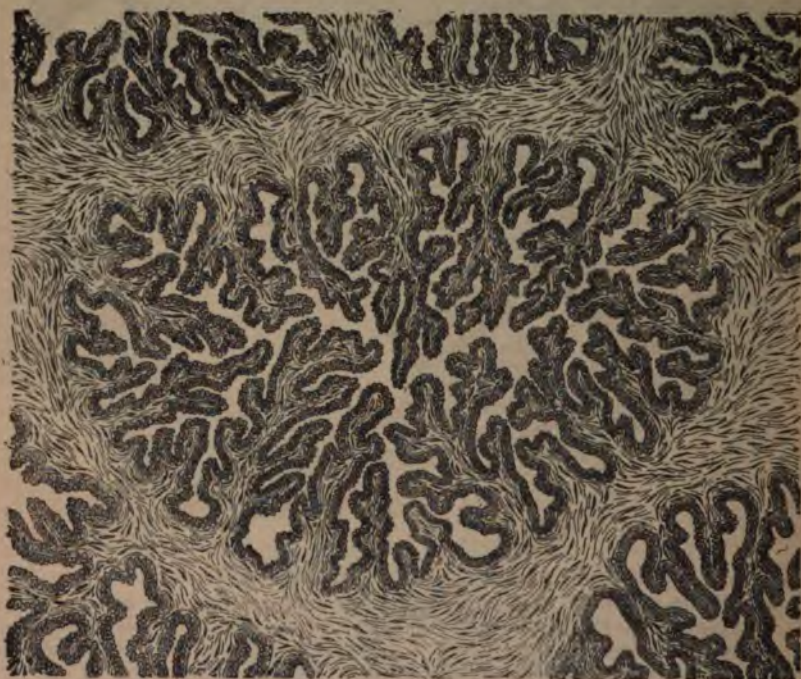


Fig. 342.—Papillary cyst of the ovary (Wyder). (Section of a tumour filled with cauliflower vegetations that perforated the wall at several points.)

The various cystic cavities are separated by trabeculae of dense fibrous tissue. Some fibrous bundles with fine vascular branches project from the wall of the cyst and divide into slender ramifications. These are they which give rise to the papillary or cauliflower appearance. Above them there is a single layer of cylindrical epithelium of medium size. (In other cystic cavities there were no papillomata, but the wall was smooth, or at most showed small unbranched buds. The contents of the papillary sacs were viscid and milky, those of the others were clear.

position it increases in size with less rapidity, and also gives rise to those compression symptoms that constantly follow in the train of all intra-ligamentous tumours tightly bound down in the roof of the pelvis.

Perforation of the sac by the papillary vegetations that it encloses may occur consequently not only in the direction of the peritoneal cavity, but also in the direction of the deeper parts, with the result that the cyst may become very intimately adherent to the pelvis, the bladder, the rectum, or the uterus, the fundus of which has sometimes been observed to be invaded by the growth.* It is not very uncommon to find in the papillary masses small calcareous concretions like grains of sand (*corpora arenacea*). These concretions show some analogy with the chalky deposits that are found in some placentas. These calcareous masses, of course, are found in other very vascular tumours (*e.g.*, tumours of the arachnoid, angiomas, &c.), and have obtained for them the name of *psammomata*.

The mode of origin of proligerous ovarian cysts (glandular and papillary) has given rise to very many discussions, and the subject is not yet definitely settled. The old "hydatid" idea had in 1807 been replaced by Meckel's theory of "dropsy of the Graafian follicle." Upon this Huguier and Bauchet† had placed some restrictions, accepting the follicular theory only for simple cysts, unilocular or multilocular. For the more complex varieties, after Cruveilhier, Virchow, and Rokitansky's‡ works had appeared, new formation, combined with areolar or colloid degeneration of the ovary, was invoked. The stroma and its colloid degeneration then were regarded as playing the chief part and the epithelial element was completely ignored; the same occurred in Rindfleisch and Mayweg's works.§

The importance of the epithelium in the origin of proligerous cysts was first strongly advocated by Klebs and Waldeyer.|| I shall give a short account of Waldeyer's views, which are

* C. Lee. Intra-ligamentous ovarian cystoma with papillomatous growths extending through the cyst into the fundus uteri (Med. Record, New York, 1880, vol. 17, p. 267).

† L. J. Bauchet. Pathological anatomy of ovarian cysts (Mém. de l'Acad. de Méd., 1859, p. 28).

‡ Cruveilhier. Patholog. anat. of the human body. Paris, 1830-1842.—R. Virchow. Das Eierstockscolloid (Verh. der Gesells. f. Geb. in Berlin, 1848, vol. 3, p. 203).—Rokitansky. Ueber die cyste (Denkschr. der k. Akad. der Wiss. zu Wien., 1849).

§ Mayweg. Die Entwicklungsgeschichte der Cystengeschwülste des Eierstocks. Thesis, Bonn, 1868.

|| E. Klebs. Virchow's Arch., 1867, vol. 41, p. 4, and Handbuch der path. Anat. Berlin, 1873, p. 789.—Waldeyer. Die Eierstockskystome (Arch. f. Gyn., 1872, vol. 1, p. 252).

accepted at the present day by a large number of authorities. It is well known that in the embryo, the ovary encloses a large number of epithelial tubes, derived from the germinal epithelium that covers the organ. These tubes, named after Pflüger,* are later on destined to divide and become constricted, giving rise to the Graafian follicles, which are a secondary evolution product. In the newly-born child some of them are still to be found, and possibly they may abnormally persist, or even by an anachronism be formed in the adult. Their persistence at a somewhat advanced age cannot in some cases be doubted, and Slavjansky† found some of them in a slightly cystic condition in the ovary of a woman aged thirty. Exceptionally, these tubules may undergo cystic change before puberty, and in the infant they may be found of the size of a pea, only developing further after the establishment of adult life.‡

* The following is a short description of the germinal epithelium, the primordial ovules, and Pflüger's tubes; I take it from De Sinéty. *Practical treatise on Gynæcology*, 2nd edition, Paris, 1884, p. 610 :—

"In the early days of embryonic life, about the fourth day of incubation in the chick, at the anterior portion of the Wolfian body, a thickening of the epithelium is seen to take place. At the same time, and at the same point beneath this thickening, there occurs the formation of a bud of connective material. Amongst the cylindrical cells that make up the major portion of the epithelial mass, called by Waldeyer germinal epithelium, a few cells are seen of larger size, rounded, and furnished with a large nucleus; these elements are denominated primordial ovules. For the satisfactory study of the first stages of this development in man, Waldeyer advises the selection of a fœtus about 9 cm. in length. In a fœtus of from three to four months, the ovary is almost exclusively composed of what will afterwards be the cortical substance. The medullary substance, formed by vessels and embryonic connective tissue, presents the appearance, on transverse section, of an isolated pedicle for the cortical substance with which it only communicates over a very small space. . . . At five months the ovary presents new important modifications. The strands of connective tissue, thicker and more abundant, limit very clearly the kind of article known under the name of Pflüger's or Valentin's tubes or utricles, called also by some anatomists glandular cords. At this age the formation of the primordial follicles by constriction of the tubes may be perfectly well followed out. Primordial follicles are also seen, completely isolated, in which is very clearly to be distinguished the ovule with its vesicle and its germinal spot surrounded by a row of epithelial cells and by a limiting layer of connective tissue. . . . At birth, on the surface of the ovary, the germinal epithelium with its two kinds of cells is still found, but now the round cells have become fewer in number. The ovarian tubes, anastomosing with one another, are for the most part separated from the external epithelium by a thin layer of connective tissue. However, a few are still seen in which the communication between them and the germinal epithelium can very clearly be made out; the persistence of this anatomical arrangement has even been observed in the adult."

† Slavjansky. *Bull. de la Soc. anat. de Paris*, Dec., 1873, and *Ann. de Gyn.*, Feb., 1874, vol. 8, p. 126.

‡ Schröder. *Diseases of the female generative organs*, French trans., 1886, p. 894.

One may therefore say that not only are all ovarian cysts congenital in origin, but that many of them exist as such at birth, and may either remain stationary or take on development in later life.

When a cyst is formed at the expense of Pflüger's tubes, the central cells soften, become liquefied, and the distended walls of the tubes vegetate, and by budding give rise to new tubes. The most complex cyst, therefore, of adult life has always been at the commencement a small simple sac in the midst of connective tissue and lined by an epithelium, which is neither more nor less than the primitive glandular epithelium partially



Fig. 343.—Papillary cyst starting from the hilum of the ovary (Doran).

On the left and below, the ovary is seen almost intact. The cyst had developed in the broad ligament. An opening into the latter discovers, above, a portion of the Fallopian tube. Part of the cyst-wall has been removed to show the papillary vegetations on its internal surface.

liquefied to form the contents of the cyst. The fusion of several of these primordial cysts ends by forming the most enormous cavities; every unilocular cyst has commenced by being multilocular (Waldeyer). I have already shown how the later vegetation of the walls gives rise to papillary projections, from which an important variety of ovarian cysts derives its name.

Malassez and de Sinéty* do not admit the preponderating

* De Sinéty and Malassez. Bull. de la Soc. anat., 1876, p. 540.—Arch. de physiol., 1878, pp. 39 and 343; 1879, p. 624; 1880, p. 867; and 1881, p. 224.—There is much less

part attributed by Waldeyer to Pflüger's tubules. According to them, the germinating epithelium on the surface of the ovary is the true mother-tissue of the new growth, and the process begins by invagination of the epithelium, but this epithelial new formation, which under physiological conditions ends in the formation first of Pflüger's tubes, and later in Graafian follicles, under pathological conditions does not become so highly specialised, and only ends in the common type of lining epithelium, giving rise to tubes, or more or less spherical cavities, which, according to these authorities, have only the most remote resemblance to Pflüger's tubules or Graafian follicles. Struck by the resem-



Fig. 344.—Papillary tumours of the ovaries covering both broad ligaments (Doran).

blance between the epithelium of these tumours and the lining epithelium of normal mucous surfaces, Malassez suggests for them the name of "mucoid epithelioma."* This term, though very exact from a histological point of view, leads to some confusion

real difference than one would at first think between the view of these authors and that of Waldeyer, as this sentence by De Sinéty proves (*loc. cit.*, p. 712): "The formation of these cystic epitheliomata greatly resembles, therefore, what we know of the mode of development of the normal ovary by means of invagination of the surface-epithelium. One might further ask oneself if the penetration of the surface-epithelium into the ovarian stroma is really, from commencement to end, a recent phenomenon, or whether it does not result from some mal-development of the organ, a latent mal-formation, the evil effects of which do not show themselves till later. It is with this train of ideas that the important part has been assigned to the persistence of Pflüger's tubes in the adult, observed in some cases." Do not these words tacitly recognise the probability of Waldeyer's theory?

* Malassez. *Bull. de la Soc. Anat.*, 1874, p. 358 and foll.

in clinical language, since the word epithelioma has long conveyed an idea of malignancy; the same may be said of the term "cysto-epithelioma," adopted by some writers.* To my mind the name "proliferous cyst" is preferable.

Have papillary cysts a different histogenesis to glandular cysts? In 1887 Olshausen suggested the hypothesis that they originated in the parovarium, after Waldeyer had shown that it penetrates into the hilum of the ovary. The reasons invoked were the presence of cylindrical epithelium and the frequent inclusion of the cysts within the broad ligament. Fischel† afterwards developed this idea, and asserted that these tumours were derived from cells of the granular membrane, which, according to him, originated undoubtedly from the Wolffian body. In spite of the support accorded by Doran‡ to this view, by showing specimens in which the ovary existed side by side with a papillary cyst that sprang from the hilum (fig. 343), it cannot at present be accepted without reserve. In point of fact, Marchand and Flaischlen§ have shown that these cysts may originate on the surface of the ovary, and that they then contain ciliated epithelium, continuous with the germinating epithelium. Moreover, as Marchand remarks, it is very easy to conceive that the ciliated epithelium in the cysts may pathologically be derived from the germinating epithelium, since this relationship occurs normally for the tubal epithelium; with regard to the papillary structure, it also occurs in the tubal mucous membrane, and there is nothing surprising if a similar arrangement take place, under morbid conditions, in a similar tissue.

Summing up, therefore, the germinating epithelium is the seat

* Paul Segond. International encyclop. of surgery, French trans., Paris, 1888, vol. 7.

† W. Fischel. Arch. f. Gyn., 1879, vol. 15, p. 198.—The origin of the cells of the granular membrane is still a matter of doubt. Waldeyer believes that they and the ova have a common origin, and regards them as a derivative of the germinal epithelium. According to His and Kölliker the cells of the granular membrane originate at the hilum from the canaliculi of the Wolffian bodies. Cf. Kölliker, *Entwicklungsgeschichte*, Leipzig, 1879.—His, *Untersuchungen ueber das Ei, &c.* (Zeitschr. f. Anat. u. Entw., 1877, vol. 1).

‡ Alban Doran. Clinical and pathological observations on tumours of the ovary, London, 1884, pp. 61 and 62 (figs. 15 and 16).

§ F. Marchand. Beiträge zur Kenntniss der Ovarialtumoren. Halle, 1879.—N. Flaischlen. Zur Lehre von der Entwicklung der papillären Kystome oder multi-fokulären Flimmerepithelkystome des Ovariums (Zeitschr. f. Geb. und Gyn., 1881, vol. 6, p. 231).

of origin of papillary as well as of glandular cysts. This common origin, it must be confessed, does not entirely satisfy the mind. How is one then to explain the profound differences that exist between these two kinds of new growths, and the special characters of the papillary cysts in particular? How are we to explain the fact that they are more commonly bilateral, their inclusion in the sub-serous tissues, and lastly, their greater degree of malignancy? There can be no doubt that further research is necessary on these points.

I shall consider at the same time the liquid contents of all kinds of proligerous cysts, although there is a sensible difference according as the cavity is glandular or papillary; but it must not be forgotten that in the same tumour cysts of both kinds may be present.*

Speaking generally, the contents of large cavities is thinner than those of small cysts. Except in the majority of parovarian cysts, in which it is clear like water and non-albuminous (unless inflammation or effusion of blood has altered it), the liquid contents of ovarian cysts feels always more or less oily; it is slightly syrupy, sometimes considerably so. The colour varies from the yellow of barley-sugar or from apple-green to coffee or chocolate colour; these deeper tints are due to the presence and alteration of extravasted blood; sometimes plates of cholesterin may be found in it; in small cysts, masses like grains of rice may be seen. In the papillary cysts, on account of the absence of goblet cells, the liquid is never so viscid as it is in the case of glandular cysts.

Great hopes were formerly held that the chemical properties of the liquid contents would serve to form a diagnosis between it and ascitic fluid in such cases as the external characters left some room for doubt. Unfortunately these hopes have not been fulfilled. Waldeyer regarded the presence of paralbumin † as characteristic of ovarian cysts. It seems certain that it is very nearly always present at least in glandular cysts; papillary cysts, however, may only contain traces. Out of 23 cysts

* Olshausen, *loc. cit.*, p. 85.

† The characteristic property of paralbumin is that it is precipitated by nitric acid, and re-dissolved immediately on the addition of acetic acid. McMumm (The spectroscopic in medicine, London, 1880) made some spectroscopic researches upon this subject, but they proved fruitless.

examined with the object of investigating this question, Oerum* found paralbumin in 18, and did not find it in 5. I may add that the presence of this substance has been demonstrated in the expectoration of bronchitis, a cyst in the neck, in the urine of patients affected with suppuration of bone, and even in some cases of ascites. One therefore can see how cautious a diagnosis based upon the presence or absence of this substance must be. For details upon the methods for isolating paralbumin, I refer the reader to the special works of Huppert and Hammersten.†

Another point presented by chemical analysis, and one which seems more positive, is taken from the amount of solid residue in the various liquids. According to Méhu, if it is about 70 grammes per litre, the case is, without doubt, one of an ovarian cyst. According to Quénu, this proportion is too low, and is much nearer 100. We therefore have here a most valuable criterion.‡

III. *Dermoid cysts*.—These cysts are generally small; but they may also reach very considerable dimensions by being combined with proligerous cysts, or even simply by reason of an inflammatory attack, which suddenly augments the quantity of their liquid contents. Although they may long be latent, and even may not be revealed until the autopsy, as soon as they begin to increase in size they become allied, from a clinical point of view, to the ordinary or proligerous cysts that I have just described. Both ovaries may be transformed into dermoid cysts. Poupinel§ has collected 44 cases of this condition.

They are not nearly so frequently seen as proligerous cysts. Olshausen has collected 2,275 cases taken from series of ovariectomies performed by Spencer Wells, Keith, Schröder, Krassowski, A. Martin, Billroth, C. von Braun, Esmarch, Dohrn,

* H. T. Oerum. *Kemiske Studier over Ovariecystevædsaker*. Copenhagen, 1884.

† Huppert. *Ueber den Nachweis des Paralbumins* (Prag. med. Woch., 1876, No. 17).—Hammersten. *Zeitschr. f. physiol. Chemie*, 1882, vol. 6, part 3, p. 194, and *Upsala läkare. Förhandl.*, 1881, vol. 16, p. 461.—Cf. also A. Gonner. *Ein Beitrag zur chemischen Diagnose der Ovarial Flüssigkeiten* (*Zeitschr. f. Geb. u. Gyn.*, 1884, vol. 10, p. 193). He concludes, after a critical and painstaking study of the question, that it is not possible by chemistry to definitely diagnose the fluid from an ovarian cyst. Hammersten's reaction affords valuable assistance, but is not in the least degree pathognomonic.

‡ Quénu. *Bull. et Mém. de la Soc. de chir.*, July 25, 1888, p. 645.

§ G. Poupinel. *On the generalisation of ovarian cysts and epithelial tumours*. Thesis, Paris, 1886.

and himself. Out of this number only 80 cases of dermoid cysts were found (3·5 per cent.).

Their inner surface is lined by a membrane which recalls the skin in appearance and microscopic structure; it consists of a corneous layer formed by several rows of flat cells, and beneath it are the cells of a true Malpighian layer.

A layer of fat separates the dermic layer from the fibrous shell of the sac. On the surface of the dermis are to be found papillæ, which, by uniting, may simulate the appearance of a nipple* and hairs, which are implanted in hair-follicles, some-



Fig. 345.—Dermoid cyst of the ovary.

times provided with sebaceous glands; the latter were first shown to exist by Friedländer. Sweat glands are also present. The hairs, implanted or loose in the cyst, are long, tawny in colour, stuck together by sebaceous matter, and rolled up into balls. A collection of sebum resembling the vernix caseosa fills more or less completely the sac, and often forms kinds of isolated balls. This fat, which has occasionally an oily consistency, encloses a large number of epithelial cells, crystals of cholesterol

* D. von Velitz, of Buda Pesth (Virchow's Arch., 1887, vol. 107, p. 505), has published a curious case of a dermoid cyst containing a mamma. The patient was 40 years of age, and had borne 12 children. Ovariectomy was performed for a dermoid cyst containing an oily material, in which was mixed some fair hair; on the inner surface a kind of mamma was found as large as a child's fist; by pressure a liquid resembling colostrum was made to exude from the nipple. The areola of the breast was rose-coloured, and it was surrounded by a circle of hairs.

and of the fatty acids. Fairly frequently also teeth and bones are found in these cysts.

The bones are implanted in the sac wall and more or less covered by the dermis; they are irregular, generally flattened in shape, and are composed of a compact tissue; cartilage exists in small masses, and sometimes, as Labbé and Verneuil have de-

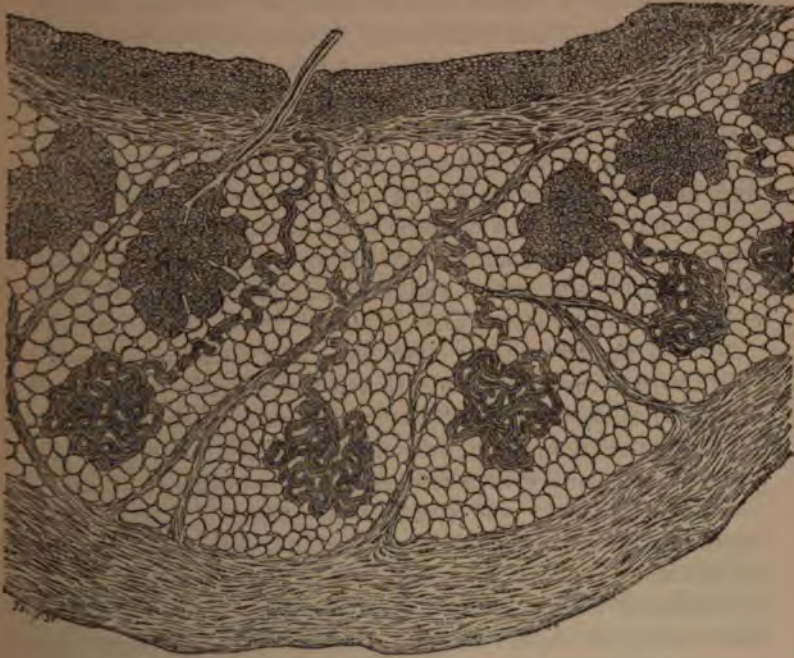


Fig. 346.—Dermoid cyst of the ovary (Wyder).

The cyst was filled with a fatty mass that enclosed some reddish hairs. The wall has a similar constitution to the normal skin. The upper layer in the figure (on the internal surface of the cyst) is formed of cells pressed one against another, and therefore becoming flattened as they approach the surface. Beneath this there are two layers of fasciculated connective tissue separated by loose adipose tissue. These two layers send to one another strands of connective tissue, which penetrate through the adipose tissue, and form a fibrous support for it. An important peculiarity of this preparation is the presence of sudoriparous glands side by side with sebaceous glands that often are provided with hair follicles.

scribed, these masses may be articulated by the intermediary of bundles of fibrous tissue. The teeth are enclosed in the wall, and project into the cavity in which they are implanted from bony *débris* hollowed out into kinds of alveoli in which they are

loosely fixed. They only vaguely recall the shapes of perfect teeth, and never completely correspond to the incisors, canines, or molars; the cement is generally wanting. A curious remark of Holländer is that the teeth are always fixed very exactly in one position, a little inclined towards the median axis of the body, insomuch that, by examining the interior of a cyst, one may determine to which side it belonged. As many as 100 teeth have been found (Schnabel). Autenreich has described a case in which 300 teeth were removed from a cyst, which even then contained more. Some writers assert that they have found carious teeth. But as Lannelongue* says, one is perfectly justified in holding with Magitot that the appearances were due, not to true caries, but to a process of absorption.

P. Ruge† found in a dermoid cyst, beneath a bone that resembled an inferior maxilla provided with molars, a small mass, which from its shape, size, and acinous structure, gave the idea of being a submaxillary gland.

Smooth muscular fibres have also been seen in the dermis (Virchow); with regard to striated fibres, their existence is denied by Olshausen, who believes that such cases as those in which they are seen are not dermoid cysts, but teratomata. In point of fact, many writers confound these two classes. Cruveilhier cited a case in which nails were present,‡ Baumgarten§ reported a most remarkable case in which the cyst contained, in addition to skin, hair, and teeth, a body resembling an eye provided with a kind of a convex cornea, and an epithelium analogous to the retina. In this cyst also there were present a portion of mucous membrane analogous to that of the stomach and intestine, and lastly some encephaloid nerve-substance.

The presence of grey nerve-substance in dermoid cysts raises great difficulties. In one case Virchow found some lamellar nerve-substance, like that obtaining in the cerebellum. Key

* Lannelongue. *Treatise on congenital cysts*, Paris, 1886.

† P. Ruge. *Obst. and Gyn. Soc. of Berlin*, Jan. 10, 1890 (*Centr. of Gyn.*, 1890, p. 99).

‡ In the gynæcological museum at Halle there is preserved a dermoid cyst, found in the body of a goose; it contains many feathers.

§ P. Baumgarten. *Virchow's Arch.*, 1887, vol. 107, p. 515 and foll.—Retinal epithelium had already been found in Marchand's case. *Bresl. ärztl. Zeitschr.*, 1881, No. 21.

found some in a bony cavity. Rokitansky in a kind of capsule of the sac, near to the spot where a bone was implanted.* Other anatomists have exceptionally found nervous filaments running to supply the teeth.† Besides these solid materials, dermoid cysts contain a milky fluid, often mixed with cholesterin plates.

Mixed tumours formed by the combination of dermoid cysts with the other varieties of ovarian cyst, have long been known and described.‡ They have been freshly described by Poupinel, from whom I borrow, word for word, the following description. In one and the same tumour there may be found side by side dermoid cysts and cysts with epithelium of various kinds, pavement, cubical, ciliated, goblet, polymorphic, &c. Even, further, one may find collected in the same cystic cavity, epidermis with its appendages (hairs, sebaceous glands, sweat-glands), and a uniform or polymorphic epithelial lining. Lastly, the internal lining of the sacs may be completely formed of skin. But it is not rare, even under these circumstances, for the cutaneous lining to be incomplete. In point of fact, one finds in a large number of cases that the skin only exists at one or more points in the dermoid cavity. It often assumes the shape of a large papilla, which ordinarily serves only as the point of origin of hairs. The rest of the wall presents a smooth fibrous appearance, or resembles a mucous membrane rather than the skin.

This description, that is found, so to speak, at each step in the observation of dermoid cysts, makes it extremely regrettable that complete histological examinations are so rare. Without doubt, numbers of so-called simple dermoid cysts ought really to be classified amongst mixed tumours.

The fibrous framework is generally exclusively formed of young adult or myxomatous connective tissue. However, apart from the teeth, which are products of ectodermic origin, and

* Olshausen, *loc. cit.*

† Mahot and Legros. *Bull. de la Soc. anat.*, 1867, p. 102.

‡ Lebert. *Practical treatise on general and special pathological anatomy*, Paris, 1857, vol. 1, p. 258.—Eichwald. *Wurzb. med. Zeitsch.*, 1864, p. 422.—E. Martin. *Berl. klin. Woch.*, March 4, 1872, No. 10, p. 113.—Kreis. *Corresp. f. schweiz. Aerzte*, 1872, No. 100.—Holcher. *Inaug. Dissert.*, Göttingen, 1878.—Flesch. *Verhandl. der phys. med. Gesellsch. in Würzburg*, 1872, vol. 3, p. 111.—Flaischlen. *Zeitschr. f. Geb. u. Gyn.*, 1881, vol. 6, p. 127 (Schröder's case), and vol. 7, p. 448.—Spencer Wells. *Ovarian and uterine tumours*, 1882, pp. 41 and 104.—Lannelongue and Achard, *loc. cit.*, pp. 57, 80, and 128.—G. Poupinel. *On mixed ovarian tumours* (*Arch. de physiol.*, 1887, 3rd series, vol. 9, p. 394).

which are never met with except in the neighbourhood of a cutaneous covering, one sees in the fibrous walls of mixed cystic tumours cartilage and bone-tissue. This may also be seen in tumours that have no dermoid character at all. Poupinel* has reported a case of mucoïd cyst of the ovary followed by generalisation; in the cyst wall were found cartilaginous nodules.

Ossification is fairly frequent in mixed tumours as in simple dermoid cysts; but consideration of the mixed tumours elicits this interesting fact, that the bony plates are not absolutely in contact with the dermoid portions, and that in some cases they are quite independent of them. Lastly, in the stroma of mixed tumours other tissues are often to be found, such as smooth and striped muscular tissue, nervous tissue.

The two ovaries may be simultaneously affected. Then, as in the case of a unilateral ovarian tumour, all possible combinations of tumour may be present. The two ovaries may each be converted into a mucoïd epithelial cyst, with the epithelium either of one type or polymorphic. Both of the cysts may, for example, be lined by ciliated epithelium (Brodowski, &c.). Often the ovaries have each been found transformed into a mixed tumour (Flesch, Neumann, and Poupinel).

Other varieties may also be found, such as a dermoid cyst on one side and a mucoïd cyst on the other (Leber, Young, Herchl, Mugge, &c.), or a mixed tumour on one side and a mucoïd cyst on the other (Poupinel).

The question of the origin of dermoid cysts is one of the most obscure in general pathology.† The view which regarded them as cases of ectopic gestation scarcely deserves mention, since they have often been met with in children. The theory of diplogenesis by fetal inclusion is also inadmissible; the excessive number of teeth occasionally found is amply sufficient to overthrow it.

The term "plastic heterotopy" used by Lebert to embrace all cases of this kind, is only a denomination, and not an explanation.

Other and more reasonable hypotheses remain; that of parthe-

* G. Poupinel. Thesis, Paris, 1886. (Case 163.)

† The frequent occurrence of purely dermoid cysts in certain definite regions of the neck and head is well known; on the other hand those complex tumours that have been designated under the name of "teratomata" are frequently seen at other points (sacral region, epigastrium, roof of the palate).

nogenesis,* which invokes the power of the germinal epithelium, is rendered doubtful by the presence of analogous formations in other regions of the body where this special epithelium does not exist.

The "incarceration" theory, although it is open to criticism, is, taken as a whole, the most satisfactory explanation. By it, it is allowed that during intra-uterine life certain portions of the blastoderm have been imprisoned in the midst of the tissues in consequence of being, as it were, nipped off, and have afterwards taken on development, giving rise at the same time to a disordered formation of those tissues that normally spring from it. Verneuil was the first to formulate this ingenious conception to explain cysts of the branchial clefts in the neck or the head.† The researches of His on the "axial cord," at the expense of which, according to him, the generative tract is developed, further aid us in understanding the complexity of the elements that are found in the dermoid cysts of the ovary. There are only found organs in the formation of which all the blastodermic layers participating in that of the axial cord take place. It is impossible to differentiate in it by dissection the different germinating layers, and it is conceived in consequence that in the ovary, as in the testicle, portions corresponding to the horny layer, to the medullary tube (ciliated epithelium), or to the middle layer (muscles, bones) may go astray. The incarceration theory is thus very powerfully supported.‡

Lannelongue§ frankly accepts this theory. He remarks, further, that the evolution of these foreign tissues provokes in the organ which is their host certain modifications of structure and certain changes of relations, independent of the embryonic development, which, by associating themselves with the incarcerated tissues, add further to the complexity of the abnormal formation. It is perhaps in this way, according to Lannelongue, that the union of proligerous ovarian cysts with dermoid cysts, and the transitions existing between these two classes of new

* Répin (On the parthenogenetic origin of dermoid cysts of the ovary, Thesis, Paris, 1891) has supported this theory.

† A. Fränkel. Ueber Dermoidcysten der Ovarien u. gleichzeitige Dermoide im Peritoneum (Wien. med. Woch., 1888, No. 28, p. 865; No. 89, p. 909; and No. 30, p. 940).

‡ Olshausen, *loc. cit.*, p. 404.

§ Lannelongue and Achard, *loc. cit.*, p. 128.

formation, are to be explained. Nevertheless Lannelongue does not entirely abandon the conception of diplogenesis in those cases in which considerable traces of foetal organs are found in the cysts, which have from this cause sometimes been described under the name of foetal cysts. According to him, these curious productions are partly cystic and partly of the nature of double monsters. In their origin, he says, the production of double monsters is found associated with that cause which determines the formation of cysts. The share borne by each varies in different cases. The higher one goes in the series, the more does the double monster element tend to preponderate and the cystic element tend to diminish, until it reaches extinction. Thus, in the genesis of these tumours, two factors have to be distinguished: the production of cystic cavities, and the existence of a supplementary centre of development. The admission of this independent centre is really made to explain the complexity of the new formations; but it must be allowed its origin gives rise to fresh problems quite as difficult themselves as those which this hypothesis endeavours to solve.

IV. *Parovarian cysts*.—From a practical point of view it is impossible to completely separate cysts of the ovarian region independent of the ovary from cysts of the ovary, properly so called. Moreover, although the cysts of which I am about to speak are not, strictly speaking, "ovarian cysts," since anatomically they are distinct from the ovary, it is convenient to describe them at the present time on account of the clinical and surgical similarity of the two classes.

A series of characters proper to this kind of cysts makes of them a very definite group. They are customarily designated by the name of cysts of the parovarium, or of the organ of Rosenmüller,* because their definite point of origin in the broad ligament, between the layers of which they are enclosed, corresponds very exactly to the seat of these embryonic vestiges, and because, being themselves of a special kind of structure, it seems natural to assign to them a special place of origin. Nevertheless it is by no means conclusively proved that unilocular cysts of the broad ligament, with thin walls and trans-

* E. Follin. *Researches upon the Wolffian body*. Thesis, Paris, 1850.—Verneuil, *Researches on the cysts of the Wolffian body* (Mém. de la Soc. de chir., 1857, vol. 4, p. 58).

parent contents, always start from the parovarium. Alban Doran* has seen and described specimens that are opposed to this theory. He is inclined to regard them as simple cysts, formed by lacunæ, or as Verneuil's sub-serous hygromata. Mangin† also believes that they may simply develop in the connective tissue independently of the parovarium. De Sinéty‡ considers the view that they are developed at the expense of Rosenmüller's organ as extremely doubtful. He compares them to mucoid epitheliomata, and believes that the difference in their contents is simply due to the simplicity of the epithelium, for clear liquid is also found in proligerous ovarian cysts when they are not lined by goblet epithelium. De Sinéty even goes



Fig. 347.—Unilocular parovarian cyst of the broad ligament.

Above and to the left the ovary is seen, quite independent and cut open. The elongated Fallopian tube is stretched over the surface of the cyst (Doran).

so far as to ask if supernumerary ovaries could not play some part in the formation of these cysts. But if they have the same origin as the cysts of the ovary, how is their very different structure to be explained? And, moreover, are we to hold that supernumerary ovaries are so excessively frequent? We have here a mystery that is not entirely cleared up. However, it is convenient to adopt the expression sanctioned by general use,

* Alban Doran, *loc. cit.*, p. 49 (fig. 10).

† Mangin. Sketch of the conditions obtaining amongst para-ovarian cysts, suggested by a serous cyst of the broad ligament (*Nouv. Arch. d'obst. et de gyn.*, June 25, 1883, p. 104).

‡ De Sinéty, *loc. cit.*, p. 866.

and to call "parovarian cysts" those cysts which, though in the ovarian region, are independent of that organ, are found perfectly free from it, either in its immediate neighbourhood, or separated from it by a ligamentous fold; only the term "parovarian cyst" must be held to mean a cyst close beside the ovary, rather than a cyst of the parovarium.*

These formations are not rare. Olshausen has met with them 32 times in 284 ovariectomies, or in 11·3 per cent. of cases.

It is necessary to divide these cysts into two varieties. The first and most common I shall call "hyaline parovarian cysts"; the other, less frequently seen, are "papillary parovarian cysts."

Hyaline parovarian cysts.—This variety of cyst is usually unilocular. There are, however, some exceptions. Lawson Tait† relates a case on which he operated, and which he examined carefully, in which there were six sacs side by side, and according to him it was a bilocular cyst on which Spencer Wells operated. Moreover, even when it seems as if the sac were single, by carefully searching through the wall, one may sometimes discover in it some very small secondary cysts, no larger than hemp-seeds or peas.

The cyst wall is remarkably thin; its external surface is covered by, but not adherent to, the layers of the broad ligament at all points at which it is not in immediate contact with the pelvis or neighbouring organs. Nevertheless a kind of elongation of the broad ligament in many cases forms a kind of broad pedicle for it. When the cyst is sessile, it is loosely united to neighbouring parts, unless previous inflammation have occurred. It is white in colour, or slightly greenish, and the small vessels of the peritoneal covering are clearly delineated by its transparency. The Fallopian tube lies upon the cyst, the first effect of its development being to separate the layers of peritoneum between which the tube is enclosed; the ovary is pushed outwards, sometimes flattened, but always very distinct. The internal surface is smooth and lined with ciliated epithelium, which may co-exist with ordinary cylindrical epithelium. The liquid contents are very clear, like water; its specific

* I shall point out further on, amongst the varieties of small-sized cysts that are only of slight surgical interest, the existence of cystic formations which, on the contrary, undoubtedly arise from traces of the Wolffian body.

† Lawson Tait. Edinb. Med. Journ., July and August, 1889, vol. 35, p. 97.

gravity is slightly greater than that of water (1002—1008). There is no precipitation on heating, for, unless there has been either inflammation or extravasation of blood, it contains no albumen.* A large proportion of chlorides has been noted in it.

Papillary parovarian cysts.—Side by side with the hyaline parovarian cyst, with its thin wall and transparent contents, which is the type most frequently seen, there exists another variety characterised by the presence of papillary formations. Is this variety primarily distinct, or is it, as Lawson Tait believes, only a developmental phase of the first variety? On this point one cannot dogmatise. In any case,† it is necessary to be aware of the existence of this description of cyst. For a long time there has been a certain amount of confusion in consequence of our incomplete knowledge on this point. On the one hand, some writers wrongly regarded the two expressions, "parovarian cyst" and "cyst of the broad ligament" as synonymous, and on the other hand, they thought that these parovarian cysts always had a thin wall and transparent, limpid contents containing but a small proportion of albuminous bodies in solution. Now, although cysts answering to this description are undoubtedly the most common, they are not the only ones. There are some parovarian cysts whose contents are viscid; and for that, it is only necessary that their walls should present some papillary vegetations; the contents may even be made albuminous and diversely coloured by recent or old extravasation of blood. But these characters are not sufficient to lead to the mistaking of these cysts with mucoid ovarian cysts,‡ exceptionally included

* Spiegelberg, however, sometimes discovered the presence of paralbumin in these cases, according to de Sinéty (*loc. cit.*, p. 870). But were they not really papillary cysts of the broad ligament?

† Alban Doran, *loc. cit.*, p. 51 and foll.—According to Doran these papillary cysts arise from the parovarium, and alone merit the name of "parovarian cysts," whereas cysts without vegetations and with purely liquid contents, he says, arise from the substance of the broad ligament, independently of any embryonic remains. The absence of vibratile epithelium in the former does not in any way disprove their origin. Wilhelm Fischel (Ueber Parovarialkysten und parovaríelle Kystome, in *Arch. f. Gyn.*, 1879, vol. 15, p. 198) has remarked, according to Waldeyer, that the epithelium of the Wolffian body is not originally provided with cilia, so that the non-ciliated cubical epithelial lining of the first variety of cyst may represent Wolffian epithelium.

‡ Terrillon. On a variety of para-ovarian cysts and its relation to cysts of the ovary (*Bull. et Mém. de la Soc. de chir.*, July 13, 1887, p. 460).—It is easy to see by the cases cited in this paper that the papillary variety of parovarian cysts, already long ago described by A. Doran, was under consideration.

between the layers of the broad ligament. The distinguishing characteristic is that they are always unilocular (excepting for the almost microscopic cavities in their walls), while ovarian cysts are almost invariably multilocular. There is only a superficial analogy in those cases which have led to the confusion.

In exceptional cases these cysts, by developing mainly in the direction of the abdominal cavity, acquire a certain amount of mobility, and draw on the broad ligament in such a way as to form of it a kind of lamellar pedicle.*

As a rule very benign, these cysts may also occasionally take on extremely malignant characters. Lawson Tait relates the case of a young girl from whom he removed a parovarian cyst, apparently of a perfectly simple nature, and without any internal vegetations, but his patient six weeks later showed signs of glandular infection, and succumbed in three months to the secondary deposit of malignant disease in various organs.

Dermoid parovarian cysts.—A certain number of undoubted cases of dermoid cysts independent of the ovary† have been observed in the broad ligament.

B. Medium-sized cysts. I. *Small cysts arising in traces of the Wolffian and Müllerian ducts.*‡—It is very common, particularly in cases of fibroma or of commencing tumour of the ovary to find, either in the broad ligament or close to the tube, small transparent vesicles having no surgical importance, but the anatomical signification of which is sufficient for them to receive some mention. These cysts are of three kinds:—

1. *Cysts of the hydatid of Morgagni* (fig. 338, 8), attached to

* Quénu (Revue de Chir., 1890, p. 46) describes a cyst of this kind, accompanied by ascites, which he attributes to the extreme mobility of the tumour.

† Lawson Tait, *loc. cit.*—Sänger. 3rd Congress of German gynæcologists (Centr. f. Gyn., 1889, No. 31, p. 542).

‡ Bland Sutton (Medical Times, Nov. 26, 1884, vol. 2, p. 728, and Trans. Roy. Soc. Lond., 1885) has brought forward some interesting facts in comparative anatomy relative to lesions of the uterus and ovaries in lower animals. These lesions are infinitely more frequent in the domesticated than in the wild condition.

Cysts arising from the remains of the Wolffian body are somewhat common in batrachians. Out of 250 frogs and toads, Sutton found them in 10 cases. In birds and batrachians the left Müllerian duct alone persists to form the oviduct. The right disappears and opens, in the form of a small blind diverticulum, into the cloaca. This small rudiment of the canal is often the starting-point of cystic formation. A curious fact is the following: when a hen-bird presents the plumage and appearance of the cock, she generally is the subject of some ovarian change. In old mares, cysts of the ovary and of the tubes are very frequently seen; two-thirds of them are thus affected. They have also been found in cats, goats, &c.

the fimbriated extremity of the tube, and varying in size from a pea to a cherry, transparent, and lined by a single layer of endothelium: it is well known that the hydatid of Morgagni is the remnant of the extremity of the Müllerian duct.

2. *Supra-tubal cysts* (fig. 338, 5), but little larger than the former, and presenting the same appearance and structure: it seems that these are micro-cysts of the broad ligament, which have travelled beneath the serous covering, by a sort of gliding movement, to take up this unusual seat.

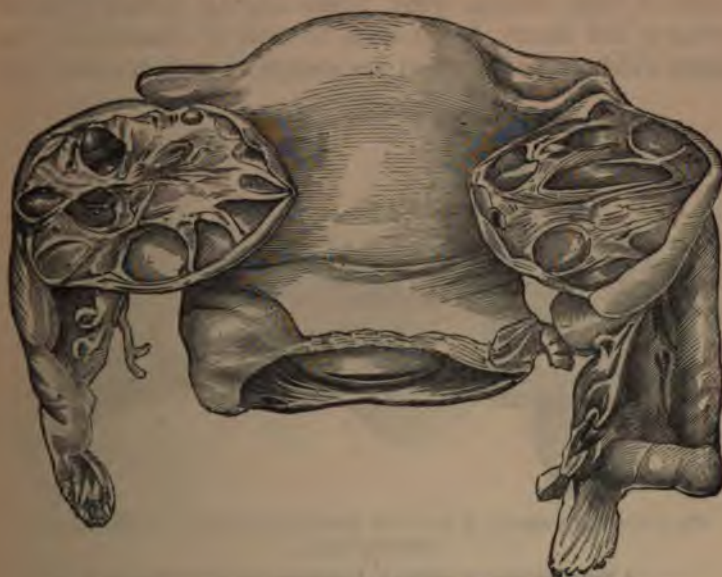


Fig. 348.—Cystic disease of the ovary (conglomerate serous follicular cysts).
The tumours are shown open (Barnes).

3. *Micro-cysts of the broad ligament*; of these some arise from the organ of Rosenmüller (fig. 338, 9, 11), others are independent of it, and their exact origin is not known. According to Doran, those only which spring from the vertical tubes of the parovarium contain ciliated epithelium, and become papillary in their later development; the others, which do not spring from the parovarium (fig. 338, 4, 6), and even those which develop in the horizontal tube, when they may become only attached to the broad ligament by a long thin pedicle (fig. 338, 9), are lined by a simple endothelium.

In point of fact, it is impossible to assert definitely that the micro-cysts of this third variety have a clearly limited development like those of the first. It even seems probable that, though certain of them may remain insignificant during their whole evolution, others, as the result of some unknown irritative process, are the starting-point of large cysts of the broad ligament with either purely liquid or else papillary contents.

II. *Follicular cysts*.—Dropsy of a Graafian follicle has long been regarded as the initial or principal cause of the development of large ovarian cysts. Some English writers even yet cling to this theory, but it must be entirely abandoned. The cysts which own this origin are always of moderate size, and



Fig. 349.—Cystic disease of the ovary (conglomerate serous and myxomatous follicular cysts).

l, Fallopian tube; *o*, ovary; *a*, *b*, myxomatous follicular cysts.

if they evoke morbid symptoms, the latter are much more like those of chronic inflammation of the appendages, than like those of an ovarian cyst; one might say, by a little straining of terms, that the operation that they call for is rather castration than ovariectomy. I have therefore considered them above when dealing with the lesions of ovaritis.

The reality of cystic dilatation of the follicles was conclusively proved by the observations of Rokitansky;* some writers also denominated this anatomical variety by his name.

The follicular cyst or dropsical follicle forms a small unilo-

* Rokitansky. Woch. der Zeitschr. der Ges. der Wien. Aerzte, 1855.

cular sac, varying in size from a hemp-seed to a walnut* ; it is the "miniature cyst" of Cruveilhier. But the agglomeration of several of these cysts may exceptionally increase the size of the ovary to that of the fist or of the foetal head (Rokitansky, Lawson Tait). The wall is smooth and lined by a single layer of epithelium ; the contents are slightly viscid ; the ovule may

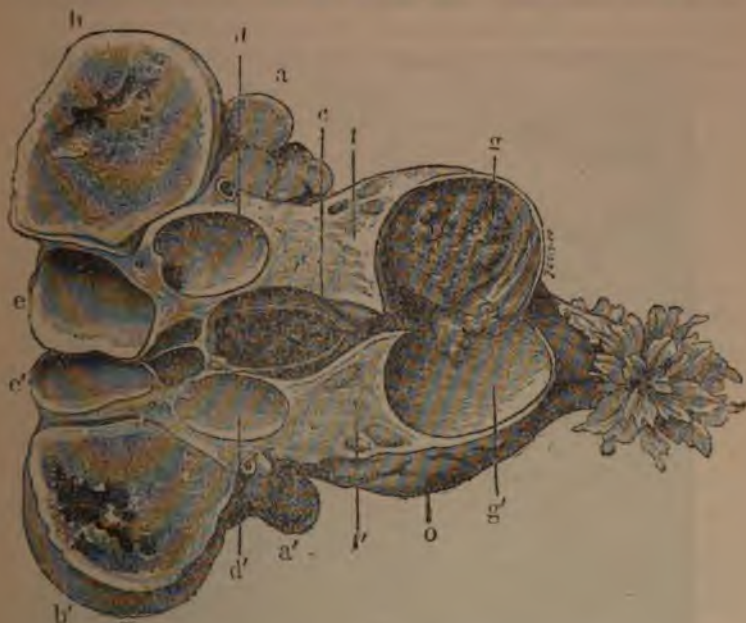


Fig. 350.—Cystic disease of the ovary (conglomerate serous and myxomatous follicular cysts).

(Section of the tumour shown in the preceding figure, natural size.)

a, a', small myxomatous cysts; *b, b'*, large myxomatous cysts; *c, c'*, follicular cysts with liquid contents; *e, e'*, follicular cysts with caseous contents; *o, f, f'*, ovarian tissue with small follicular cysts.

often be discovered, even when the cysts have attained some considerable size.†

In the newly-born child follicles are occasionally found in a very advanced state of development, towards the centre of the ovary ; they seem to have some relation to the rapid increase of

* Cf. on this question an interesting observation of Neumann (p. 653).

† Ritchie. Contrib. to assist the study of ovarian phys. and path., London, 1865.

development that occurs immediately after birth.* But there is no reason for calling these large follicles by the name of cyst.

The *large conglomerate follicular cysts* that transform the whole ovary into a partitioned and multilocular† mass, form a very definite anatomical variety that corresponds also to an equally well-characterised clinical variety. There is, I think, every reason to distinguish this lesion, the developmental characters



Fig. 351.—Follicular cyst of the ovary with myxomatous degeneration (x 50).

A, A, loose myxomatous tissue towards the interior of the cyst; B, B, dense myxomatous tissue towards the exterior of the cyst.

of which are so distinct,‡ from other medium-sized cysts, by the name of “cystic disease of the ovary.” These conglomerate cysts, which form a tumour rarely, as large as the head, and generally the size of the fist, are never an early stage in

* De Sinéty. Researches on the ovary of the fœtus and of the newly-born infant (Arch. de phys., 1875, 2nd series, vol. 2, p. 501 and foll.).

† Waldeyer. Die Eierstockskystome (Arch. f. Gyn., 1872, vol. 1, p. 252).

‡ S. Pozzi. Annal. de Gyn., April, 1890, vol. 33, p. 252.

the formation of a more voluminous tumour, as was formerly believed. They preserve their moderate proportions for an indefinite length of time, and this peculiarity separates them, surgically, from glandular proligerous cysts, which, moreover, are very different in histological characters.

The *micro-cystic change* that accompanies fibrosis of the ovary, although it has the same histogenetic origin, viz., the follicle, forms also a perfectly separate anatomical and clinical variety. The cysts here always remain so small that they do not sensibly alter the shape of the ovary, and they never transform it into a tumour. In this lesion, which really belongs to ovaritis, and along with which I have already described it, the whole ovary may be seen riddled with small cysts, no larger than a hemp-seed. It has been wrongly looked upon, by some writers, as a phenomenon of physiological evolution. In point of fact, it is a pathological process which may exist of itself, or when there is any irritation in neighbouring parts (uterine fibroid, inflammation of the Fallopian tube). The fibrous modification of the stroma of the ovary is merely secondary,* but is invariably consecutive to follicular degeneration. In any case fibro-cystic change of the ovary is a very different condition, both from the standpoint of macroscopic pathological anatomy, and clinically, to the cystic disease, constituted by large conglomerate follicular cysts.

The contents of the cavities in cystic disease of the ovary is serous or sanguinolent. Nevertheless I have removed a polycystic ovary in which a certain number of the sacs, varying in size from a pin's head to a hazel-nut, were filled with a serous liquid, while others contained a caseous or lardaceous-looking material, which, examined microscopically by Toupet in Professor Cornil's laboratory, was found to be myxomatous in nature. The disease was unilateral; the other ovary had undergone fibro-cystic degeneration. This is, I believe, a kind of secondary degeneration of the follicular cysts that has not hitherto been described (figs. 349, 350, 351).

III. *Cysts of the corpora lutea*.—This variety also was first described by Rokitsansky.† He believed that the corpora lutea

* Bullus. Die kleincystische Degeneration des Eierstocks (Third Congress of German gynecologists, Friburg, 1889, in Centr. f. Gyn., 1889, No. 32, p. 563).

† V. Rokitsansky. Ueber Abnormalitäten des corpus luteum (Allg. Wien. med.

of pregnancy could alone undergo cystic change; but this opinion was too absolute, for Gottschalk* has found them in a nulliparous woman. As a rule, these cysts do not exceed in volume the size of a hazel-nut. Nevertheless cases have been published in which they far exceeded these proportions. One of the two tumours described by Gottschalk was as large as an orange, the other as large as a small apple. Schröder† has seen them as large as a pigeon's egg. Nagel has seen cases reaching to the size of an apple, and even to that of the adult head. Microscopical examination of the cyst wall shows the papillary buds characteristic of the corpus luteum, and dispels all doubt. It will prevent any confusion of cysts of the corpus luteum (fig. 252) with follicular cysts whose wall has become thickened and coloured by extravasated blood, or with a suppurative ovaritis with inspissation of the pus when these cysts have become inflamed under the influence of an accompanying salpingitis.‡



Fig. 352.—Cyst of the corpus luteum (natural size) (Nagel).

To understand the genesis of cysts at the expense of that which one usually considers to be a cicatricial process, it must be remarked that the idea of retraction of the tissues for the formation of corpora lutea is quite erroneous, and must be replaced by the idea of proliferation and new formation of the ovarian tissue (Call and Exner).§

The new theory proposed by Toupet|| would even cause the

Zeit., 1859, Nos. 34 and 35).—Cf. also Ritchie, *loc. cit.*—Slavjansky. Zur normalen und pathol. Histologie des Graaf'schen Bläschens (Virchow's Arch., 1870, vol. 51, p. 470).—Nagel, *loc. cit.*

* Gottschalk. Berlin Gyn. and Obst. Soc., Nov. 22, 1889 (Centr. f. Gyn, 1890, p. 12).

† Schröder, *loc. cit.*, p. 398.

‡ A case of suppurative ovaritis by Quénu (Bull. et Mém. de la Soc. de chir., 1888, p. 416) may quite possibly have been dependent upon an inflamed cyst of a corpus luteum.

§ Call and Exner. Zur Kenntniss der Graaf'schen Follikel und des corpus luteum bei Kaninchen (Sitzungsber. der Wien. Akad., April 15, 1865, vol. 71).

|| Cf. J. Luquet. Contrib. to the study of corpora lutea, Thesis, Paris, 1888, No. 277, p. 85. This theory while it attributes the formation of the corpus luteum to the granular membrane, like Waldeyer's, differs from it by assuming the connective-tissue nature of the vitelline membrane, or at least in that it admits the existence of a fibrous layer which lines it, and serves as a support to the cells of the ovular granular region. This fact once admitted, the formation of the corpus luteum is easily accounted for in the following way: at the rupture of the ovisac, the ovular granular layer and the

formation of the corpus luteum to come under the general law of the development of tissues by making its formation depend upon an identical process with that which is seen in mucous surfaces in way of development or of inflammation.

Tubo-ovarian cysts.—I shall here insert a few details relative to a variety of cysts which is worthy of distinction and classification, in consequence of an important morphological peculiarity that they owe to the connections which they acquire with the Fallopian tube. The cystic ovary in these cases, engrafted upon



Fig. 353.—Cyst of the corpus luteum (x 60). Nagel.

a; connective tissue unprovided with epithelium on its internal surface; b, yellow layer of the corpus luteum; c, normal ovarian tissue in the neighbourhood of the hilum.

the dilated tube, with which it communicates in such a way that the cavity, generally much inflected and cornuate, is formed partly by the tube and partly by the ovary. The first good description of this anatomical variety was given by Richard.* As a

subjacent connective-tissue layer remain *in situ* as the parietal granular layer, the germinal vesicle and the yolk alone being expelled; the two layers of sub-epithelial connective tissue, internal and external, begin to proliferate and form papillary processes that penetrate into the midst of the cells of the granular layer, some going towards the centre, others towards the periphery.

* A. Richard. *Mém. de la Soc. de Chir.*, 1853, vol. 3, p. 121.—*Bull. de l'Acad. de Méd.*, 1856, vol. 21, p. 356.—*Bull. gén. de thérap.*, 1857, vol. 52, p. 152.—Cf. also on

rule it is small tumours of the ovary (cysts of the Graafian follicles) which are thus bound down to the dilated tube, so that their volume is generally not great; but Hildebrandt and Olshausen have seen tubo-ovarian cysts formed by proligerous cysts, and consequently of very great size; and two other cases reported by the last-mentioned writer probably depended upon cysts, of the broad ligament.* This variety, therefore, may, so to speak, be superadded upon any and every species of cyst.

The tube ordinarily remains permeable, which allows of the flow of the secreted liquid into the uterus as soon as the pressure within the sac becomes excessive. Thus one may meet with a "profluent ovarian dropsy" comparable to that which has been described under the heading of hydro-salpinx by the name of "profluent tubal dropsy." This communication acts as a safety-valve, and by preventing the excessive distension of the cyst,



Fig. 354.—Pedicle of an ovarian cyst.

The pedicle is short: the ovarian expansion has not been completely opened up (the cyst has been emptied).

hinders its increase in size. Hennig was able to make out in one case a periodical lessening of the tumours, which were bilateral after they had thus been evacuated. With regard to the origin of these composite cysts, one may ask oneself whether the adhesion of the tube to the ovary precedes or follows the formation of the cyst; whether there does not at the first occur some inflammation of the appendages leading to their mutual adhesion; or yet again, whether there may not have coincided previously

this subject: Labbé. *Bull. de la Soc. Anat.*, May, 1857, p. 141.—Rokitansky. *Allg. Wien. med. Zeit.*, 1859, No. 35.—Hennig. *Monatsch. f. Geb.*, 1862, vol. 20, p. 128.—Hildebrandt. *Die neue gynäk. Universitätsklinik zu Königsberg*. Leipzig, 1875, p. 109.—Thornton. *Trans. Obst. Soc., Lond.*, 1879, vol. 21, p. 119.—H. Burnier. *Zeitschr. f. Geb. u. Gyn.*, 1880, vol. 5, p. 357, and 1881, vol. 6, p. 90.—Wachsmuth. *Inaug. Dissert.*, Halle, 1885.—Terrillon. *Progrès méd.*, 1888, No. 49, p. 472.

* Olshausen, *loc. cit.*, p. 59.

a hydro-salpinx and an ovarian cyst, which have united and become fused by absorption of the partition between them (Schramm).^{*} I, personally, am inclined to believe that such is most frequently the process, so that the lesion might just as well be described in the chapter on the pathology of the tube as in that on diseases of the ovary.[†]

Out of 300 cases of ovariectomy, Olshausen found three cases of tubo-ovarian cysts, one of which was bilateral.

Pedicle.—Whatever the origin of an ovarian cyst may be, an important morphological peculiarity dominates their surgical history. It is the presence, the various arrangement, or the absence of a pedicle binding them down to neighbouring parts. Sometimes it is very thin, almost membranous, and the tube is

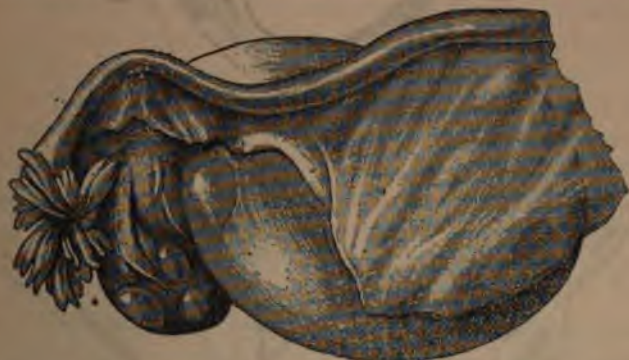


Fig. 355.—Conglomerate follicular cysts (cystic disease of the ovary) included within the layers of the broad ligament.

separated from it by the free expansion over the ovary (fig. 354). Frequently this expansion is opened up, and the tube, drawn upon the tumour, adheres to it and undergoes a certain amount of concomitant increase in length. The pedicle then contains two parallel cords, the tube and the ligament of the ovary. The

^{*} J. Schramm. *Centr. f. Gyn.*, 1890, No. 33, p. 593.—Gottschalk (*ibid.*, 1891, No. 22, p. 458) believes that the real starting-point is dropsy of a Graafian follicle.

[†] Cf. on this subject Doran. Specimens illustrating the development of tubo-ovarian cysts as a result of inflammation of the uterine appendages (*B. M. J.*, 1887, p. 781).—Griffith. Tubo-ovarian cysts. (*Trans. Obst. Soc., Lond.*, July 1, 1887, in *B. M. J.*, 1887, p. 1277).—Elliot. A case of chronic salpingitis; tubo-ovarian cysts acutely inflamed, hæmorrhage into the cyst; operation; recovery (*Amer. Journ. of Obst.*, 1887, p. 141).—F. B. Robinson. Tubo-ovarian cysts (*ibid.*, 1890, vol. 24, p. 1311 and foll.).—Von Rosthorn. *Reün. de la Soc. gyn. de Bonn*, 1891 (*Centr. f. Gyn.*, 1891, No. 25, p. 515), and *Verhandl. der deutschen Gesells. f. Gyn.*, 1891, p. 327.

narrowest point of the pedicle is, as a rule, at what has been called the "infundibulo-pelvic ligament," or the fold of peritoneum that extends from the pelvic wall to the ovary, and by which the vessels reach the organ.

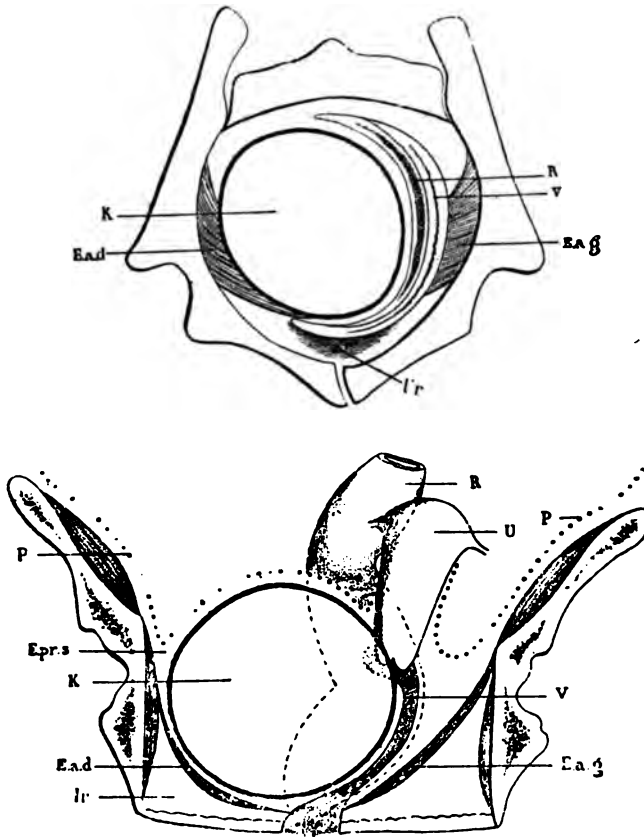


Fig. 356.—Retro-peritoneal dermoid cyst (Sänger).

(The tumour, which was as large as the head of a fœtus, occupied the superior pelvi-rectal space, and lay behind and on the right of the rectum).

K. Cyst. U. Uterus. R. Rectum. V. Vagina. P. Peritoneum. E. a. d. Right levator ani. E. a. g. Left levator ani. I. r. Ischio-rectal fossa. U. r. Urethra. E. p. r. s. Superior pelvi-rectal space.

The size and thickness of the pedicle are very variable; they depend not only upon the distance that separates the tumour

from the edge of the uterus, but also upon the thickness of the broad ligament, the muscular fibres of which are sometimes hypertrophied, the connective tissue œdematous, and the veins dilated. Lastly, it is at the pedicle that the walls of the cyst are sometimes the thickest, and here traces of the ovary may be found.

The pedicle, which may exceptionally be present in certain cysts enclosed between the layers of the broad ligament (dermoid and parovarian), is formed by a simple distension and displacement of the peritoneum; it is broad, lamellar, and membranous. When no pedicle is present, the cyst is enclosed between the layers of the broad ligament wholly or in part. It is the customary seat for parovarian cysts, hyaline and papillary, for dermoid cysts, and lastly, for some proliferating glandular or papillary ovarian cysts, which Freund explained as arising from a congenital malformation, which, in other words, would be an excessive covering of the ovary with peritoneum. Small follicular cysts and cysts of the corpora lutea may exceptionally have this seat, as I have seen myself (fig. 355). The class of cysts enclosed between the layers of the broad ligament is therefore essentially artificial; it is extremely interesting from a surgical point of view, but this peculiarity can serve as a basis for no nosological classification. It is quite wrongly that some surgeons still make this term synonymous with that of parovarian cyst, and even of that variety of parovarian cyst which is most common, viz., that in which the wall is thin and the contents hyaline in nature. In point of fact the following various species and varieties of cysts may be enclosed between the layers of the broad ligament:—

1. *Cysts reaching a large size*: A. Parovarian cysts, hyaline and papillary (constantly, at any rate at first).

B. Proliferous ovarian cysts, papillary and glandular (rarely).

C. Dermoid cysts, ovarian (common) or parovarian (rare).

2. *Cysts reaching only a moderate size*: A. Follicular cysts (rare).

B. Cysts of the corpora lutea (rare).

C. Residual cysts, of the organ of Rosenmüller (common).

The enclosed cyst may, according to the case, only occupy the external portion of the ligament towards the pelvis, or only the internal portion, and then be in close connection with the

uterus, or lastly, it may fill the whole of the broad ligament, and then displace the ligament by relaxing it, so to speak, upwards and outwards on the opposite side. An important portion of the tumour may be outside the ligament above towards the abdominal cavity by forming a free cyst added to an enclosed cyst, from which it is separated by a furrow.

According to Terrillon,* secondary inclusion of proliferating cysts differs from primary inclusion of parovarian cysts. In the first case, the enclosed portion of the cyst contracts adhesions with the neighbouring tissues, so close that a second vascular pedicle may be added to the primary utero-ovarian vascular pedicle; the former comes from the horn of the uterus and is due to a dilatation of the anastomosis that normally exists between the superior branch of the uterine artery and the termination of the utero-ovarian.† From this there results a violet appearance and thickening of the broad ligament that does not exist in parovarian cysts. Such a distinction, however, is quite illusory and based upon observation restricted to the variety of hyaline parovarian cysts. On the contrary, the remarkable tendency of some papillary parovarian cysts to invade neighbouring parts, and especially to adhere to the uterus, is well known.

It is important further to distinguish a special variety of sessile cysts. They are those which do not remain confined between the layers of the broad ligament, but which pass beyond its limits and run beneath the peritoneum in the cellular interspaces far from their starting-point. They may be called retro-peritoneal cysts.

All varieties of cysts seem able to take on this kind of growth; it has been noticed particularly in hyaline or papillary parovarian cysts, but also in dermoid cysts, and in glandular ovarian cysts. On the left side the tumour may separate the iliac meso-colon and come into contact with the ilium. I have enucleated a hyaline parovarian cyst which had contracted such relations. On the right the sac may reach to the cæcum. It may also, passing beyond this point, penetrate through the mesentery up to the

* Terrillon. Relations between ovarian cysts and the broad ligament (*Rev. de chir.*, 1884, p. 111).

† Pierre Delbet. Ovarian cyst enclosed within the layers of the broad ligament (*Bull. Soc. Anat.*, April 27, 1888, p. 477).

kidney,* the liver,† or even the diaphragm.‡ Posteriorly, Douglas' pouch is raised, and the cystic sacs become located between the uterus and rectum.§ In front the vesico-uterine cul-de-sac is sometimes raised; the bladder drawn upon by it and by the urachus becomes excessively elongated in the form of a tube, that the operator is extremely likely to wound. Laterally cystic masses by infiltrating beneath the peritoneum, between it and the pelvic aponeurosis, and even right into the iliac fossa, compress the ureter, and are a very frequent cause of secondary kidney changes. It is the papillary and the glandular cysts of the areolated and gelatinous varieties that give rise to the most extensive and most serious retro-peritoneal invasion, and the more, inasmuch as these tumours (contrary to what obtains with hyaline parovarian cysts) are very closely adherent to neighbouring parts, and are very difficult or sometimes impossible to enucleate. Dermoid cysts have also been seen to become fixed in the retro-peritoneal pelvic cellular tissue.|| They have often, wrongly, been thought to have started from the walls of the bladder, rectum, or the uterus, to which they were intimately adherent. Occasionally they have proved an obstacle to delivery.

Adhesions.—In the first phases of the development of cysts, the cylindrical epithelium that covers them protects them from the formation of adhesions (Waldeyer). But the desquamation of this covering allows later of the production of adhesions under the influence of rubbing and external irritation. Loose and glutinous at first, they become more and more closely bound down with the progress of time. The anterior surface of a cyst has been seen so closely adherent to the peritoneum, that operators have been known to have largely separated it from

* Zweifel (Obst. Soc. of Leipzig, Oct. 17, 1888, in Centr. f. Gyn., 1888, p. 439) operated for a retro-peritoneal dermoid cyst that had tracked up behind the serous membrane, "burrowing like a mole" until it came to receive part of its vascular supply from the pancreas. The displaced left kidney was obliged to be removed; recovery. When reporting this case Zweifel quotes a similar case of Bardenheuer's (Der extra-peritoneale Explorativschnitt, Stuttgart, 1887, p. 680), in which an analogous tumour was removed through a lumbar incision. Death occurred after 15 hours.

† Bassini. Trans. of the 5th Congress of Italian Surgeons at Naples, 1888.

‡ Heurtaux. Gaz. des Hôp., Aug. 20, 1889, p. 858.

§ Wilhelm Hager. Centr. f. Gyn., 1890, No. 1, p. 4.—This case was one of a proligerous ovarian cyst.

|| Sanger. Centr. f. Gyn., 1890, No. 31, p. 542.—This cyst was enucleated by perinotomy. In a later work (Ueber Dermoidcysten des Beckenbindegewebes, &c., in Arch. f. Gyn., 1890, vol. 37, part 1, p. 100) Sanger has collected 11 cases of dermoid cysts in the pelvic cellular tissue.

the abdominal walls, in the belief that they were separating the cyst itself. Omental adhesions may be so extensive and so richly provided with vessels, that the cyst henceforth draws through them the greater part of its nutrition. In a case of this kind I found it more practicable to commence the operation by dividing the pedicle, which was relatively thin, and then proceeding to ligature the adhesions in succession, the cyst being made to rotate on its axis from below upwards. The bowel may also be, so to speak, fused with the cyst wall in such a way that dissection is impossible, and that it becomes necessary to cut the cyst to remove it. Adhesions to the pelvic walls are particularly dangerous by reason of the danger that there is of tearing the ureter or a large blood-vessel. It is sometimes quite impossible to overcome them when they are very extensive; but these are almost always the direct adhesions of retro-peritoneal cysts without the intermediation of the serous membrane.

Ascites.—The presence of a very small quantity of fluid in the peritoneum is fairly common, but its accumulation in the form of a large ascitic effusion is only rarely seen. Terrier* seems to have fallen upon an exceptional series when he found that out of 100 cases of ovariectomy, 10 had abundant ascites, and 25 had slight ascites. Terrillon,† out of 68 cases, only noticed this complication on one single occasion.

In the great majority of cases one has then to do with papillary cysts with extension of the vegetations beyond the cyst wall, sometimes even with abundant secondary growth in the neighbouring peritoneum. In the case of glandular cysts there may be present partial fatty degeneration of the wall, or even according to Quénu‡ rupture of very small superficial cysts, the contents of which irritate the peritoneum. This writer attributes, I think, an exaggerated importance to the phenomena of osmosis, induced by the colloid material secreted by the vegetations or poured out by the small cysts; there is no need of this consideration to understand the exudation of ascitic fluid caused by the irritation of a pathological fluid; the ascites

* Terrier, 1st, 2nd, 3rd, and 4th Series of 25 ovariectomies (Rev. de chir. 1882, p. 349, 1884, p. 1, 1885, p. 12, 1886, p. 986).

† Terrillon. Bull. et mém. Soc. de Chir., 1884, p. 659, and 1886, p. 904.

‡ Quénu. Rev. de Chir., April 10, 1886, vol. 6, p. 265.

forms a true mode of defence for the peritoneum when it has not been able to isolate the irritant body by the formation of adhesions. The vascular richness of the tumours has also been invoked to explain the ascites.* But this factor seems to be only of very slight importance since telangiectatic fibromata may exist without any ascites.

The characters of the ascitic fluid accompanying ovarian cysts is such as to often allow of its recognition; it is richer in solid materials than the ascites of cirrhosis (60 to 70 per 1,000, instead of 25 per 1,000 according to Méhu †), and often contains characteristic cellular elements (Quénu). It may be yellow or blood-stained, and the latter character seems to correspond to a greater degree of malignancy of the tumour.

Intra-cystic apoplexy.—Small hæmorrhages are common within the sacs, and to them are due the deep or even chocolate colour of their contents. Serious hæmorrhages, veritable apoplexies that may endanger life, have also been seen. The cyst is then found distended with clots, without one being able perhaps to recognise the point at which the vessel gave way.‡ Elongation and twisting of the pedicle predispose to hæmorrhage.

Suppuration.—Suppuration of a cyst may occur after an evacuating or exploratory puncture; the introduction of pathogenic germs cannot then be a matter of doubt. It is to this cause also that the so-called spontaneous inflammations are to be attributed. Adhesions with inflamed Fallopian tubes have probably sometimes allowed of the access of micro-organisms.§ Suppurative inflammation may follow upon sloughing from twisting of the pedicle. Lastly, after parturition and under the influence of an attenuated form of puerperal septicæmia, suppuration of dermoid cysts has been known to occur.

Twisting of the pedicle.—This is an accident that is not common, but not very rare. The cyst may be seen completely detached from its primary point of insertion and forming a free mass within the abdomen, or simply held by a few filamentous

* Gundelach. On the symptomatic ascites of ovarian tumours. Thesis, Paris, 1887.

† Méhu. Study of the pathological liquids of the peritoneal cavity (Arch. de méd., Nov. 9, 1877, vol. 2, p. 513).

‡ Parry. Amer. Journ. of Obst., Nov., 1871.—Rosenberger. Berl. klin. Woch., 1880, p. 271.—P. Segond. Encycl. intern. de chir., vol. 7, p. 630.

§ Weil (Prag. med. Woch., 1878, p. 43) has related a case of suppuration of a cyst that baffles all explanation.

threads.* These are generally cases of polycystic areolated tumours, or of thick-walled dermoid cysts, having the consistency of solid bodies. I have seen one case of the first class. Baumgarten and Hofmeier have seen dermoid cysts become perfectly free. If the tumour has not contracted any adhesions before its separation, it forms a foreign body, which leads to a somewhat forcible reaction in the peritoneum and a, so to speak, acute ascites. In the opposite case it may continue to live by means of its secondary attachments. But they in their turn may also become the seat of the same accident.† If torsion takes place slowly in a chronic manner, if one may so speak, it has been seen to be followed by favourable results, and to lead to an arrest of development in the new growth without leading to the peritoneal reaction. Fatty change with partial absorption then occurs; calcification has also been seen. But as a rule this progressive torsion is accompanied by acute attacks of peritonitis and increase in size of the cyst by hæmorrhage. One of the uncommon results of torsion is gangrenous inflammation of the tumour; a sudden twist leading to sudden death of the neoplasm, and intestinal adhesions serving as a means of approach for micro-organisms must then have occurred. Intestinal obstruction may also be one of the consequences of a twisted pedicle.

Peritoneal generalisation. Metastases.—Metatypical proliferation of the epithelium of glandular cysts, upon which Malassez has rightly laid so much stress, with colloid and carcinoid new formations, present characters very closely resembling the atypical processes observed in the case of malignant growths; it is therefore not a matter for surprise that, under the direction of influences that are so far unknown, ovarian cysts should take on the characters of malignant tumours, should become generalised in the peritoneum, and sometimes even in far distant parts, and should recur after removal. All these characters have been united under the somewhat vague but well understood title of metastases.‡ The two following kinds may be distinguished:

* Heurtaux (Bull. et Mém. de la Soc. de Chir., 1886, vol. 12, p. 747) has supported the idea that rupture of the pedicle may be brought about by simple stretching in some cases without twisting.

† V. Chalot. Transplanted ovarian cyst: accidents of the new pedicle (Ann. de Gyn., 1887, vol. 87, p. 161).

‡ Cf. on this subject W. L. Atlee. General and differential diagnosis, &c. Philad.,

A. Metastasis by spontaneous infection; B. Metastasis from operative infection.

A. *Metastasis by spontaneous infection.*—The villous or cauliflower formations of papillary cysts may long remain enclosed within the sac; but at some time or other, either because they have distended it to such an extent that it ruptures, or because they have simply eroded and perforated some definite point of its wall, some vegetations make their appearance outside the cyst-wall. Henceforth a new phase in the history of the cyst commences: in the first place, the protective epithelial lining being broken, the peritoneum is irritated and ascites occurs; in the second place, the new growth having overcome the barriers which had hitherto kept it in check, tends to become generalised by infection of neighbouring parts in a manner that has been compared to the contamination from spot to spot that occurs from auto-inoculation, in the case of syphilitic mucous tubercles.

One finds then vegetations disseminated often in very considerable numbers, not only over the ovary tube or uterus, but also upon the intestines, the great omentum, the parietal peritoneum, and even the walls of the aorta.* In such cases one may fairly ask oneself whether an operation does not run the chance of being of necessity incomplete, and what is the destiny of the secondary vegetations when the primary tumour has been extirpated. Numerous cases, however, prove that even under these circumstances recovery may take place and be permanent, suggesting that the scattered vegetations may undergo atrophy

1873, p. 372.—Beinlich. *Charité-Annal.*, 1874, vol. 1, p. 403.—Kolaczek. *Virchow's Arch.*, 1875, vol. 75, p. 399.—Marchand. *Beitrag zur Kenntniss der Ovarialtumoren*, Halle, 1879, p. 9.—Mennig. *Inaug. Dissert.*, Kiel, 1880.—Thornton. *Med. Times*, Feb. 19, 1881, vol. 1, pp. 213 and 673.—G. Meyer. *Charité-Annal.*, 1882, vol. 7, p. 417.—John Williams. *Obstet. Trans. of London*, 1882, vol. 24, p. 93.—A. Fränkel. *Wien. med. Woch.*, 1883, pp. 805, 909, and 940.—Netzel. *Centr. f. Gyn.*, 1883, No. 6, p. 102, and 1884, No. 6, p. 95.—Werth. *Pseudo-myxoma peritonei* (*Arch. f. Gyn.*, 1884, vol. 24, part 1, p. 100).—Baumgarten. *Virchow's Arch.*, 1884, vol. 97, p. 1.—Olshansen. *Zeitschr. f. Geb. u. Gyn.*, 1885, vol. 11, p. 238.—Schlegtendal. *Centr. f. Gyn.*, 1885, No. 38, p. 593.—Poupinel. On the generalisation of cysts and of epithelial tumours of the ovary. Thesis, Paris, 1886, and *Arch. de Physiol.*, 1887, vol. 9, p. 29.—Freund. Ueber Häufigkeit und Behandlung der bösartigen Eierstocksgeschwülste (61st Versamm. deutsch. Naturforscher in Köln, 1888).—Teichmann. Ueber maligne Ovarialtumoren. *Inaug. Dissert.*, Jena, 1888.—A. Hadjes. Contrib. to the study of the generalisation of cystic mucoid epitheliomata of the ovary, Thesis, Paris, 1889.

* Friedrich. Ueber metastatische proliferirende Papillome der Aortenwand bei primären prolif. Kystome des Ovariums, Kiel, 1888.—Fränkel. Proliferirendes papilläres Ovarialkystom. (*Centr. f. Gyn.*, 1891, No. 21, p. 428).

or secondary retrogression. In a case reported by Thornton of a bilateral papillary cyst that had ruptured, and vegetations from which had been grafted upon the peritoneum, recovery was verified after a period of four years; in another case the patient became pregnant after an operation, when the pelvic peritoneum was found covered with papillomata; in a third case, in which Thornton was obliged to leave in Douglas' pouch a tumour the size of a filbert, this mass had not increased the least in size after a period of three and a half years. Flaischlen and Lawson Tait have described similar cases.*

Metastatic infection of the peritoneum has only been seen very rarely in the case of glandular ovarian cysts.† It seems to be secondary to spontaneous rupture of the cyst, and then one finds in the peritoneal cavity, with or without gelatinous masses, sacs, generally of small size, engrafted upon the omentum, or the intestines, or retro-peritoneal. I have myself seen one case of this kind. The tumour was bilateral, polycystic, and there were metastatic masses in Douglas' pouch, in addition to a free sac, as large as an orange, that was engrafted upon the mass of intestines; no doubt this latter sac came from the rupture of one of the ovarian tumours; there was a little ascites; the patient succumbed very rapidly. Runge‡ obtained a recovery, verified six months after operation, in a similar case, where cystic formations were scattered over the omentum, the bladder, and the posterior abdominal wall.

Metastatic formations have also been recognised with dermoid cysts. Kolaczek reports a case of Martin's in which, during the removal of a dermoid cyst with thick and smooth walls, somewhat considerable ascites was found, together with several yellowish nodules, as large as peas, scattered over the serous membrane; some of these nodules contained light-coloured hair. Fränkel, in one of Billroth's cases, also saw dermoid formations in the abdominal cavity associated with a cyst of this character. In some cases the infection is not limited to the peritoneum, but invades the pleura by means of the lymphatics after having affected the inferior surface of the diaphragm. In a case that

* Thornton. *Loc. cit.*—Flaischlen. *Berl. klin. Woch.*, 1882, p. 92.—Tait. *Philad. Med. Times*, 1884, vol. 15, p. 1 (cf. Grunelach. *Loc. cit.*).

† Cases of Baumgarten and Schlegtendal. *Loc. cit.*

‡ Max Runge. *Fall von glandulären Ovarialcystomen mit gelatinösem Inhalt und peritonealen Metastasen* (*Centr. f. Gyn.*, 1887, No. 15, p. 238).

came under Marchand's* notice, the pleural tumours contained a gelatinous substance and alveoli lined with cylindrical epithelium that was ciliated in places. In a case seen by Terrier† the tumour of the diaphragmatic pleura presented the characters of a carcinoma. In fact these metastases of ovarian cysts may take on a structure that is histologically malignant. In this way a dermoid cyst may become the starting-point of an epithelioma that may itself extend to the uterus, the omentum, the duodenum, the liver, the spleen, or the lung.‡ Degeneration of dermoid cysts into malignant new growths, such as epithelioma, sarcoma, carcinoma, is by no means rare.§

B. *Metastasis from operative infection*.—Many cases have been reported in which, a short time after ovariectomy, gelatinous masses have been discovered in the peritoneum (*myxoma peritonei*), which seemed as if they had arisen from the inoculation of similar material that had been contained within the cyst. These masses form semi-transparent nodules varying in size from a hemp-seed to a filbert, discrete, or united into a mass that may be as large as the uterus at term. They have a greyish or bright-yellow colour, and delicate connective-tissue partitions, which are vascular or non-vascular, may traverse them as in the case of the vitreous body. Werth has shown that they are not true myxomata, and has suggested that they should rather be called “pseudo-myxomata of the peritoneum.”

Is the peritoneum infallibly destined to become secondarily infected after effusion of the contents of a dermoid cyst? Two curious cases by Engström|| show that recovery may take place although the abdominal cavity had been thereby extensively soiled. It is also known that extensive contamination of the peritoneum by the colloid contents of proligerous cysts, though it is an unfavourable condition for the success of the operation, by no means renders it impossible.¶

* Marchand. *Loc. cit.*, p. 9.

† See Poupinel. Thesis cited, p. 154.

‡ Babinski. Bull. de la Soc. anat. de Paris, May, 1883, p. 234.

§ Olshausen. *Loc. cit.*, p. 401.—G. Krukenberg. Arch. f. Gyn., 1887, vol. 30, p. 241.—Pottion. Inaug. Dissert., Jena, 1887.

|| Engström. Ist das Eindringen von Dermoidcysteninhalt in die Bauchhöhle unbedingt schädlich? (Centr. f. Gyn., 1887, p. 68.)

¶ H. Schmidt. Ovarialcystenriss, Ovariectomie, Heilung (Centr. f. Gyn., 1887, p. 772).—E. Neuber. Pseudo-myxoma peritonei. Inaug. Dissert., Erlangen, 1888.—This paper is based upon a case of Frommel's: a gelatinous cyst with accumulation of similar masses in the peritoneum; ovariectomy, recovery. Eight similar cases are reported with three recoveries.

CHAPTER II.

ÆTIOLOGY, SYMPTOMS, PROGRESS, AND DIAGNOSIS OF OVARIAN CYSTS.

Ætiology.—Symptoms. Latent period. Tumefaction period. Wasting period. Pelvic tumour. Cystic disease of the ovary. Abdominal tumour. Menstrual disorders. Sterility. Compression of the bladder, of the rectum, of the diaphragm, of the ureters. Cardiac affections. Local peritonitis. General condition. Ovarian facies. —Accidents. Inflammation. Suppuration. Twisted pedicle. Rupture of the cyst. Internal strangulation. Pleural complications. —Prognosis. Progress. Spontaneous recovery. Causes of death. Prognostic value of ascites. Malignant papillary cysts. Cancerous degeneration of glandular cysts.—**Diagnosis** of pelvic tumours from: peri-metritic inflammation; pelvic hæmatocele; tumours of the Fallopian tubes; extra-uterine gestation; retroflexion of the gravid uterus. **Diagnosis** of cystic tumours that have become abdominal from: pregnancy; ascites; tubercular or cancerous peritonitis (puncture): uterine fibroid, hæmato-metra, distended bladder; tumours of the kidney, liver, spleen, mesentery, omentum; hydatids; tumours of the abdominal wall; pseudo-cysts or phantom tumours (exploratory incision).—**Diagnosis** of the variety of cyst. **Diagnosis** of adhesions.

ÆTIOLOGY.—It is particularly during the active sexual existence of the female that ovarian cysts are found to occur. Nevertheless it is not only certain that the germ of many of these tumours has existed from the fœtal period, but also that the new growth has sometimes existed from this time, remaining in a latent state until the stimulus arrives which allows of its development. Upon this point there is no doubt in the case of dermoid tumours, and many observations tend to show that the same may occur in the case of proliferating cysts (mucoid cysts of Malassez, cysto-epitheliomata, glandular and papillary cysts). Doran, Winckel, de Sinéty, have seen in the fœtus or in the child at term, small cystic cavities, the signification and ulterior development of which have not been determined. Dermoid cysts may develop, even in the child, to such an extent as to call for an operation (Rochmer, Hamaker, Polotebnoff, Bell, &c.). On the other hand, ovarian cysts have been seen not to develop until an advanced age, 65 to 75 years (Johnson, Davis, Terrier, Owen,

&c.). I shall, however, return to this subject when dealing with the indications for ovariectomy.

Some curious cases of cysts in the same family, in sisters, have been observed (Simpson, Rose, Lever, Olshausen).

The condition is fairly frequently bilateral. Out of a thousand ovariectomies performed by Spencer Wells, it was so in 82 (or 8·2 per cent.). The proportion is much higher in papillary cysts, and Olshausen estimates it at 77 per cent., while for glandular cysts considered apart, it does not exceed 4 per cent.

Scanzoni has attributed an ætiological influence to chlorosis, but this is quite hypothetical.

Symptoms.—The commencement is only marked by vague disorders that have no particular characters, and are identical with slight forms of what I have called the symptoms accompanying uterine disease (*syndrome utérin*). They are at first simply reflex troubles dependent upon congestion of, or dragging upon the appendages. Later there are superadded compression-phenomena, of the rectum, bladder, or nerves, when the cyst is bound down by the peritoneum and cannot rise freely into the abdominal cavity. But these phenomena are absent in the vast majority of cases. Then to the latent or “metritic” (pseudo-metritic) period, there follows first of all a period of tumefaction, in which the belly increases more or less definitely in size. Now, also, the health undergoes deterioration, and a final period of wasting precedes the ulterior accidents that infallibly bring about death unless surgery intervene at the proper time.

We must distinguish two phases in the evolution of the cystic tumour, each of which corresponds to physical signs that are radically different: in the first phase, the tumour is small and lies hidden in the pelvis, being only appreciable by vaginal examination combined with bimanual palpation; in the second phase, the tumour has become abdominal, and may be easily palpated through the abdominal walls.

1. *Pelvic tumour.*—Almost invariably, when the tumour has reached a size equal to twice or three times that of the healthy ovary, its weight causes it to prolapse into Douglas’ pouch; nevertheless, where uterine retroversion exists and bars the way, it may remain fixed at the sides or in front. Its presence is recognised by bimanual palpation; its seat and connections prove its ovarian origin; it is generally hard, from the smallness

and tension of the sac, rarely elastic or irregular. To find the pedicle, Hegar's method (lowering of the uterus with forceps combined with rectal examination or bimanual palpation) is very useful. When the tumour is definitely pediculated it is very mobile, and can only be felt on vaginal examination if it be pressed downwards from above by the other hand. When it is enclosed between the layers of the broad ligament it may appear to be united to the uterus, but on examining with great care one discovers that there is a slight furrow between it and that organ. It must not be forgotten that in such a case the uterine body is deviated, either towards the sides, or backwards, or may even be in ante flexion. With papillary cysts, the tumour is frequently bilateral, and exceptionally one may be able to make out through the vaginal cul-de-sac, on its surface vegetations similar to those of a cock's comb; ascites also generally is present as well.

I have already indicated, when speaking of the pathological anatomy, the existence of a very definite variety of cystic lesions of the ovary that I have proposed to call "cystic disease." It is characterised by the multiplicity of the cysts, their small size, which does not usually allow of the tumour's reaching a greater size than that of the fist or of a foetal head, and finally, by the fact that the condition is very frequently bilateral. These tumours, by reason of their moderate dimensions, remain pelvic for an indefinite length of time; they are to be found by digital and bimanual examination, sometimes on the sides of the uterus, sometimes posteriorly, in Douglas' pouch, where they may be bound down by adhesions. One of the most constant symptoms to which they give rise is menorrhagia. Lawson Tait* has incidentally, though very clearly, described this special clinical variety, which he regards as the result of follicular cysts. He has noted its frequent coincidence with fibroid of the uterus, but it often exists quite independently of any other lesion, as in some cases that he cites, and as I have myself frequently seen. An exact diagnosis is then but rarely made, and the surgeon believes

* Lawson Tait (*Diseases of the ovaries*, 4th edit., 1883, p. 113) says that in such a case the absence of a tumour, properly so-called, in consequence of the small size of the cysts, should cause the rejection of the term "ovariotomy" when speaking of their removal. The term "oophorectomy" is in no degree preferable, and one is at a loss to know by what name the operation should be called.

that the case is one of some tubal disease (hydro- or hæmato-salpinx) which is of very frequent occurrence, and from which it must be confessed it is very difficult to distinguish cystic disease.

2. *The tumour has become abdominal.*—The possibility of feeling the base of the tumour at a certain height above the pelvis completely changes its external characteristics. If the woman is very fat, or if, being nulliparous, the abdominal walls are very firm and rigid, the administration of an anæsthetic may be useful for the formation of a thorough examination of the connections of the cyst. Anæsthesia also would be equally helpful in the first or pelvic period of the development of the tumour. By palpation of the abdomen, a spherical tumour may be felt which can be clearly defined above and at the sides, but which is less definite below; irregularity and prominences usually suggest a polycystic tumour; the resistance is more elastic and less firm in proportion to the size of the tumour; fluctuation that it was impossible to perceive before, often becomes very appreciable directly the patient is anæsthetised. Percussion over the tumour often gives obscure dulness; percussion must be very light, otherwise one obtains the resonance of the circumjacent intestines; this conducted resonance often makes the exact marking-out of the cyst by means of the pleximeter of very little value.

By digital examination and bimanual palpation the uterus is generally felt to be situated in front of the pubis in a state of anteversion, and slightly turned towards the opposite side to that on which the cyst is situated. The cervix, drawn upwards, is less easily accessible, and at times it seems as if it had vanished under the unfolding of the vaginal culs-de-sac. On passing the sound, very definite elongation of the uterine cavity may be discovered.* Later, by its development, the cyst pushes the uterus backwards (Peaslee). Lastly, there are some cases in which the uterus is pushed downwards or prolapsed; I have seen one such case in a woman who had recovered after ovariectomy with fixation of the pedicle in the abdominal wound. In cases of large cysts of the broad ligament the uterus may lie completely upon its side.

When the cyst attains enormous dimensions, the abdominal

* W. Farr (Hypertrophic elongation of the uterus upward into the abdominal cavity, &c., in Amer. Journ. of Obstet., 1890, vol. 23, p. 1195) has described a case of enormous elongation of the uterus (21 cm.) due to a large ovarian cyst.

walls become thin, and show *lineæ atrophicæ*, the *linea alba* is broadened, and the umbilicus is much distended; the umbilicus only becomes prominent if ascites co-exist. Dilated veins course over the abdominal walls, particularly over the iliac fossæ, while with the ascites accompanying cirrhosis they are chiefly visible in the epigastric and hypochondriac regions. When the tumour reaches higher than the umbilicus fluctuation may be easily perceived, at any rate over a large portion of the tumour; it may most clearly be distinguished in parovarian cysts with thin walls. By determining the area over which it may be perceived, an idea may be formed of the size of the sacs, and if there be several centres of fluctuation the polycystic nature of the tumour may be asserted confidently. Sometimes a vibration or tremulousness may be obtained rather than true fluctuation. At other points, generally towards the flanks, solid masses may be found feeling like placenta. They are microcystic agglomerations, generally areolated and having colloid contents. Percussion yields an irregularly spherical area of dullness, convex above, separated by a resonant zone from the liver dullness, unless the tumour be of so great size that the two dull areas cannot be separated. All around intestinal resonance persists. Stomach resonance may be diminished, but always persists in the epigastrium and over the left edge of the thorax. Variations of position do not influence the distribution of the dullness. In extreme cases the costal cartilages and the ensiform cartilage are everted, the liver assumes a horizontal position, and is thrust up into the concavity of the diaphragm; the heart is pushed upwards, and the abdomen encroaches greatly upon the thorax. The belly is no longer cylindrical, but projects forwards and joins the thorax, which now seems as if it were only a dependency of the abdomen, at a gentle slope.

Pressure on the vessels, aorta and iliacs, may lead to the production of murmurs, which, however, are of no importance.

There is one sound that is perceived better by the hand than by the ear; it is a sound like that of crushing snow, produced when certain tumours are palpated with some degree of force. According to Olshausen, it is due to the displacement of colloid material either from one cavity to another, or upon the surface of the cyst, if it be broken. I believe that simple peritoneal

friction gives the same sensation, and cannot ascribe to its recognition any great value.

Menstrual disorders are much less common than would *a priori* be supposed. It must not be forgotten that the affection, when the cysts are large, is generally unilateral, and that the healthy ovary suffices to ensure the regularity of menstruation.

Sterility could only be certain if both ovaries were affected, and it is well known that ovarian cysts are frequent complications of pregnancy. Gallard,* to arrive at a definite idea of the effect of cysts upon menstruation, has analysed 169 cases: in one out of every five cases it was diminished or retarded; in one out of eight there were irregularities, pain, or increase. It has been noticed that menorrhagia is not uncommon in cases of cysts fixed in the immediate neighbourhood of the uterus. After the menopause congestive phenomena have been noted in the uterus, leading to the re-appearance of a more or less irregular bloody discharge,† which makes the patient believe that menstruation has returned. Sometimes, too, under the influence of ovarian, as of uterine, tumours, a reflex modification of the breasts may be seen to occur; they then enlarge in size, and the areola becomes pigmented as during pregnancy. A secretion of a milky fluid has also been noticed, even in very young girls.

Compression symptoms at the commencement of the development of the tumour, which only occur if it be incarcerated in the true pelvis (cysts enclosed between the layers of the broad ligament and retro-peritoneal cysts), must be distinguished from compression troubles occurring at an advanced stage of the disease, when the cyst acts by its weight and by its size rather than by its connections.

Compression of the bladder leads somewhat frequently to incontinence of urine early in the development of cysts enclosed within the broad ligament; in other cases tenesmus and dysuria occur; very severe pain from compression of the nerves may be called forth under the same circumstances. As a rule, however, it is only at the later stages of the development of the tumour, and when it distends the abdomen, that symptoms dependent upon compression become pronounced. Then, too, vesical troubles, increased desire for micturition from diminution of

* Gallard. Clinical lectures on dis. of the ovaries, Paris, 1886

† F. Terrier. Rev. de chir., 1881, p. 1.

the vesical capacity, may be met with; constipation is the rule, from compression of the rectum and interference with the physiological expulsive efforts. The obstacle presented to the normal dilatation of the stomach and to the intestinal movements is a cause of anorexia and vomiting, and plays a part in the inducement of the general wasting. In cases where the tumour reaches very high in the abdomen, the play of the diaphragm and even of the ribs may be impeded, and thus extremely painful dyspnœa and cyanosis may be brought about. Another cause of the dyspnœa, sometimes not recognised, that often is superadded to the former, is that which results from compression of the ureters and the chronic uræmia which results therefrom. Too much stress cannot be laid upon the extreme importance of this complication, or on the necessity of attentive examination of the urine.* The cardiac affections that have been noticed in such cases are perhaps indirectly dependent upon the renal changes. I have already dealt with this question at sufficient length in the chapter upon Fibromata, and refer the reader to it. Varicose veins, hæmorrhoids, œdema of the extremities, call for no more than simple mention.

As soon as a cyst has attained a certain size, the cylindrical epithelium, which serves as a protective covering, desquamates in places, and henceforth adhesions occur under the influence of friction. It is particularly on the anterior wall, which is most directly in contact with a resisting surface, that they are to be found, but they may affect all the viscera contained in the abdomen. This work of local peritonitis goes on silently without leading to any febrile reaction, unless it has been provoked by some accident arising to the cyst, twisting or rupture, in which case all the symptoms of a more or less violent inflammation may manifest themselves.

The general health undergoes rapid deterioration. Two principal factors conduce towards the wasting of the patients: compression of the various segments of the alimentary canal, which, joined to the dyspepsia of reflex origin that is observed in every utero-ovarian disease, prevents the organism from recouping itself for its incessant losses; and compression of the ureters,

* Alban Doran. *Tumours of the ovary, &c.*, London, 1884, p. 152.—Terrier. *Ovariectomy; death from peritonitis; renal lesions and slight albuminuria* (*Union méd.*, 1887, p. 224).

which, even though it would long exist without leading to albuminuria, none the less exerts a powerful influence upon the uropoietic organs before it is clinically recognised and contributes to the denutrition; all other compression-phenomena which cause suffering to the patient and prevent her from sleeping act in the same direction. The women then become extremely emaciated, but the so-called "ovarian facies," to which some writers have wished to give an almost pathognomonic value, has really nothing very special about it.

Accidents. Inflammation, suppuration.—Temporary elevation of temperature and increased tenderness of the abdomen in a woman afflicted with an ovarian cyst are indices of acute inflammation, either around the cyst or in its interior; but it is only suppuration of the cyst which gives rise to regular attacks of intense fever, with rigors and sweating accompanied with acute local pain. As a rule, the history will furnish the explanation of these accidents (bruising, puncture, twisting of the pedicle).

Twisting of the pedicle.—This accident was first of all pointed out by Rokitsansky.* Many writings have since appeared upon this special point. Thornton† has lately reviewed them, adding thereto the fruit of his large personal experience. Out of 600 cases of ovariectomy, he has seen twisting of the pedicle 57 times. This accident seems less common than in Rokitsansky's time, for it then had a percentage of 13·8, whereas now it is only 9·5.‡ This depends upon the fact that now-a-days we operate for cysts much earlier. With regard to ætiology, pregnancy must be noted; out of six cases of cysts, complicated by pregnancy, upon which Thornton has operated, twisting was present five times, and in nine cases the acute symptoms came on soon after parturition or abortion. In four of his cases Thornton mentions arrest of menstruation by cold; four times puncture of the cyst; in eight cases there was no appreciable cause.

Twisting of the pedicle has been witnessed as the result of the examination of an extremely mobile tumour (Olshausen), or from

* Rokitsansky. Ueber die Strangulation von Ovarial-Tumoren durch Achsendrehung (Zeitschr. der k. k. Gesell. der Aerzte, Vienna, 1865).

† J. Knowsley Thornton. Rotation of ovarian tumours, its ætiology, pathology, diagnosis, and treatment (Amer. Journ. of the med. sciences, Oct., 1888, p. 357).

‡ O. Terrillon (On twisting of the pedicle of ovarian cysts, in Revue de chir., 1887, p. 245) says 6 per cent., and Olshausen says 6·3 per cent.—O. Küstner (Centr. f. Gyn., 1891, No. 11, p. 216) seems to have been exceptional in finding a series of 11 cases of twisting out of 33.

the change of position induced by evacuation of the contents. Anything which increases the mobility of the cyst, ascites, length and tenuity of the pedicle, is a predisposing cause.* Dermoid cysts are particularly subject to it, however slight may be their mobility, by reason of their considerable weight.

Lawson Tait has seen twisting occur more frequently towards the right, Olshausen towards the left. Veit, Röhrig, and Thornton have seen it on both sides.

If this twisting occurs slowly, progressive diminution of the tumour may result, and this is rather a favourable termination than an accident. But if it occurs suddenly, sharp pain and signs of peritoneal reaction are immediately produced, and are soon followed by a peritonitis of variable intensity. The latter may be rapidly fatal, or may take on a dropsical character; tympanites and acute formation of ascites are manifested. Such symptoms have been seen to disappear after a few days, and Olshausen does not doubt that they were cases of temporary twisting of the pedicle; he has seen two cases of it that seem to him to be indubitable. Lastly, the febrile symptoms may continue in consequence of the absorption of the products of the slow mortification of the tumour (intoxication rather than infection), and the patient dies of marasmus and cachexia.† Rupture of the cyst often coincides with twisting of the pedicle; the latter is sometimes accompanied by considerable internal hæmorrhage, the arterial blood continuing to flow, while the veins have their lumina obstructed by the torsion. These hæmorrhages add an acute anæmia to the already serious condition of the patient. Signs of peritonitis around the sac show themselves soon after, and the formation of extensive adhesions is one of the most constant results of a twisted pedicle.

Rupture of the cyst.—Rupture of the small cysts arising from dropsy of the follicles seems to be of somewhat frequent occur-

* I have even seen a case in which all the lesions and the symptoms characteristic of progressive torsion of the pedicle were produced simply by its extreme elongation, following upon a pregnancy, during which the cyst had contracted adhesions to the upper part of the abdomen.—S. Pozzi. Clinical and operative remarks upon 80 cases of laparotomy (Ann. de Gyn., April, 1890, vol. 33, p. 252 and foll.).

† Olshausen. *Loc. cit.*, p. 109.—Terrillon. *Rev. de chir.*, Nov., 1886, p. 950.—Parotitis has been noticed as one of the infective accidents that may be induced by twisting of the pedicle.

rence, and of no great importance; it may occur from spontaneous dehiscence.*

With regard to large cystic cavities, their rupture is perhaps caused either by traumatism, from a blow on the belly, a fall, or retching,† or by a previous thinning of the wall, or fatty degeneration, the result of thrombosis. Gelatinous cysts are the most subject to rupture; twisting of the pedicle often precedes it. Erosion of the sac-wall by papillary vegetations may also be an effective cause.

Perforation may occur into the peritoneal cavity, or into a neighbouring organ. The first is the more common; the liquid may be absorbed without much reaction if it be not too irritating, as in the case of serous cysts.‡ Out of 127 cases collected by Nepveu, there were 43 prolonged recoveries, 21 temporary disappearances, and 63 deaths.§ Death may be so rapid that it seems to be due to a positive intoxication by absorption of the morbid liquid; or it may be preceded by symptoms of acute peritonitis.|| Sudden disappearance of the tumour, change in shape of the abdomen, the presence of free fluid in the peritoneal cavity that the hand must displace before it can reach the remnant of the cyst, such are the pathognomonic symptoms of the accident, which induces in the patient sometimes a peculiar sensation of weakness, and frequently a sharp attack of pain. If the patient survive, she may later

* Nevertheless if these cysts have been the seat of hæmorrhage, their rupture may lead to a more or less severe effusion of blood into the peritoneum. This is, perhaps, the origin of some kinds of pelvic hæmatocele. E. Boeckel. Menorrhagic ovarian cysts (*Gaz. méd. de Strasbourg*, 1861, p. 79).—F. Rollin. Ovarian hæmorrhage, Thesis, Paris, 1889, p. 23.

† Sanger (*Gyn. Soc. of Leipzig*, in *Centr. f. Gyn.*, 1887, No. 9, p. 147) has seen an ovarian cyst rupture spontaneously under the influence of attempts at vomiting, during anaesthesia, on the operating table, before the abdominal incision had been made. If the diagnosis had not been carefully made out before, the disappearance of the tumour might have led to the belief that a mistake in diagnosis had been made.—My brother, Adrien Pozzi, saw a similar case in 1883 in Trélat's wards, for whom he was then resident obstetric assistant.

‡ Lannelongue, of Bordeaux (*Lectures on clinical surgery*, 1888, p. 563 and foll.), has related a good example of this result.

§ G. Nepveu. *Ann. de Gyn.*, July, 1875, vol. 4, p. 14.—Cf. on this subject Aronson (*Inaug. Dissert.*, Zurich, 1882), who has collected 253 cases.—J. Heitzmann. *Ueber Ruptur der Ovarialeysten* (*Allg. Wien. med. Zeit.*, 1889, pp. 45 and 56).—S. Rosinski. *Inaug. Dissert.*, Breslau, 1891.

|| One may be able, under such circumstances, to save a patient by rapid interference, as is proved by several cases: R. Morison. Multilocular ovarian cyst ruptured into the peritoneum; operation; recovery (*Edin. Med. Journ.*, 1888, vol. 34, p. 43).

present the symptoms of metastatic formations in the peritoneum with the production of ascites. Rarely rupture occurs in a latent fashion, and attention is drawn to it by some of the secondary symptoms.*

The liquid may, further, be shut off by false membranes, and form a fresh intra-peritoneal cystic collection.

Profuse diuresis and diaphoresis have been remarked in cases of intra-peritoneal rupture of ovarian cysts; anasarca has also been observed. Küstner has drawn attention to a curious symptom, viz., peptonuria.†

Rupture into the intestine generally occurs either into the rectum or the colon; in cases of suppuration of the cyst, great relief is experienced at first, but it is rare for it to go on to complete recovery; on the contrary, faecal matters may infect the cavity of the cyst and lead to hectic symptoms.

The stomach and small intestine have been the means of evacuation in a small number of cases. Profuse vomiting signalled the fact in one of Portal's cases. In cases of rupture into the intestine, an abundant diarrhoea suddenly appears.

Rupture externally by erosion of the abdominal wall at or below the level of the navel has been observed; it is fairly favourable.

Rupture into the vagina or the bladder‡ is exceptional. The evacuation of the liquid by these different ways is characteristic.

One may, finally, class amongst the modes of rupture of cysts their evacuation through the Fallopian tubes, after the formation of profluent tubo-ovarian cysts, as I have above pointed out; evacuation then is sometimes intermittent.

Internal strangulation may supervene during the evolution of ovarian cysts, either from excessive pressure on the bowel, or by its becoming twisted around the pedicle, itself often also twisted.

* Emmet (New York Med. Journ., 1884, vol. 1, p. 649) related a remarkable example before the New York Obstetrical Society.—Rokitansky (Allg. Wien. med. Zeit., 1886, No. 28) reports a case well calculated to show the extreme tolerance of the peritoneum in certain cases of rupture. The patient, who had already had an ovarian cyst tapped 21 times, fell down and found that the tumour had diminished in size. Ascites followed, but without any febrile reaction; she was tapped 24 times after this, and then laparotomy was performed; a shrivelled mass, as large as the fist, was removed, and was all that remained of the former cyst.

† Küstner. Peptonurie bei geborstener Ovarialcyste (Centr. f. Gyn., 1884, No. 47, p. 745).

‡ P. Courrent. Cyst of the right ovary; accidental opening of the bladder (Gaz. hebdom. des Soc. méd. de Montpellier, 1898, vol. 10, p. 160).

or, finally, as the result of a band or peritoneal adhesion attached to the tumour; diminution of the size of the cyst as the result of puncture may in the last case lead to fatal results.

Pleural complications have been noted with sufficient frequency to warrant their mention here. According to Terrier,* these complications precede or follow surgical interference, and are not exceptional. Demons† has noticed them nine times in fifty cases, and he opposes the generally-received opinion that pleural effusions are symptomatic of the malignancy of the new growth. With regard to their pathogenesis, he invokes the hindrance to the lymph circulation of the abdomen, which produces its effect on the pleura on the other side of and across the diaphragm.

Prognosis.—"When an ovarian tumour," writes Spencer Wells,‡ "has acquired a sufficient size to affect the general health, the probable duration of life remaining to the patient certainly does not exceed two years, and these two years are, as a rule, a sequence of evils, sometimes even of torture and despair. The cases in which expectant treatment or repeated puncture has been able to prolong life during several years, form very rare exceptions to the rule laid down." It is, however, fair to recognise that in certain exceptional cases the course of the disease may be extremely slow. T. P. Frank speaks of a woman who had had an ovarian cyst from the age of thirteen, and who was then eighty-eight years old. Such cases are, generally, dermoid or parovarian cysts. Olshausen has seen a cyst, probably belonging to the last-mentioned category, in a woman of forty-eight years, who had had it since she was nineteen. Hyaline parovarian cysts, or unilocular cysts of the broad ligament, may rupture into the peritoneal cavity several times in succession, and to each rupture there follows a fairly long respite; on the other hand, proliferating cysts sometimes take on a positively galloping course after having remained stationary for a greater or less length of time. Hyaline parovarian cysts of the broad ligament increase in size very rapidly.§ Papillary cysts may undergo a long period of arrested development after their first manifestation; but when ascites makes its appearance, showing

* Terrier. *Rev. de chir.*, 1886, p. 169.

† A. Demons (of Bordeaux). *Bull. et Mém. de la Soc. de chir.*, Dec. 21, 1887, p. 771.

‡ Spencer Wells. *Loc. cit.*, p. 315.

§ L. Tait (*Edinb. Med. Journ.*, Aug., 1889, vol. 35, p. 10) speaks of a very large parovarian cyst for which he operated, and which had developed in six weeks.

that the vegetations have perforated the sac-wall, a fatal termination is not far distant.

Spontaneous recovery, absolute or relative, is not impossible. Intra-peritoneal rupture sometimes leads to the cure of parovarian cysts; slow torsion of the pedicle very exceptionally leads to atrophy of proliferating cysts, by sinking in of their walls, and by their calcification.

Death is the usual result of the development of cysts, unless the surgeon intervene. Marasmus, peritonitis, embolism, are the three chief causes of death. Suppuration of the cyst, as the result of repeated puncture or of ill-timed treatment, was formerly very common.

What is the value of ascites from a prognostic point of view? No doubt it is a disagreeable adjunct, for it is especially common in papillary cysts where the vegetations have escaped beyond the limits of the cyst-wall, and in glandular cysts with rupture or twisting of the pedicle. However, many cases show that this complication is not absolutely unfavourable, and L. Championnière,* who has never seen a patient recover who had an ovarian tumour accompanied by ascites, has clearly had to do with a very unfortunate series.

A question that is still involved in much obscurity, is that of the benignity or malignancy of papillary cysts. There are many instances of permanent recovery after removal: I myself eleven years ago † operated for a double papilloma of the ovaries, accompanied by enormous ascites. The patient, then a young girl, is at the present time in excellent health. I have cited analogous cases when speaking of metastases. On the other hand, the great number of the cases of metastasis, or even of generalisation of papillary cysts in anatomically malignant forms, should render our prognosis extremely reserved. We have here, it may be said, an element which lies outside the actual resources of the microscope. It seems as if the extreme histological instability of these new growths, the easy transformation of their cylindrical epithelium into a metatypical or an atypical epithelium, places these cysts, so to speak, in a perpetual condition of "imminent malignancy." Cohn,‡ out of fifty cases of papillary

* L. Championnière. *Bull. et Mém. Soc. de chir.*, 1825, p. 727.

† Four ovariectomies, &c. (*Gaz. méd. de Paris*, March, 1879, p. 180).

‡ Ernest Cohn. *Die bösartigen Geschwülste der Eierstücke* (*Zeitschr. f. Geb. u. Gyn.*, 1886, vol. 12, part 1, p. 14).

cysts which had been followed up after ovariectomy, found twenty which seemed to him to be undoubtedly malignant, anatomically, and it must be remarked that the microscope can never allow us to assert that similar formations are clinically benign. It is much better to always take the worst view of the case, and always to fear generalisation. Poupinel* has formulated very similar reservations.

Glandular cysts may present cancerous degeneration. Hofmeier† and Cohn‡ have pointed out the racemose appearance the cystic masses as sometimes announcing this malignant transformation. The clinical characters leave no doubt upon the question in such a case: a tumour that has already been in existence for some time undergoes rapid and sudden increase in size, wasting and cachexia quickly supervene, and there are many adhesions formed, particularly in the true pelvis, œdema of the lower limbs and of the abdominal walls, quite out of proportion with the size of the tumour and the quantity of ascites, comes on, effusion takes place into the pleural cavities, &c.

The prognosis of operations for malignant tumours, characterised by these symptoms, is very unfavourable. However, since there is no doubt that good success has sometimes been obtained in cases thought to be desperate, it seems to me that the indication is always to operate when one has reason to believe that the operation itself will be recovered from. Leopold,§ fearing this degeneration, has given it as a general rule, that every ovarian tumour should be removed so soon as it is diagnosed, and particularly if it be bilateral.

Diagnosis. A. *The tumour is pelvic.*—Early in the development of ovarian cysts it is very difficult to distinguish them from all other tumours arising on the sides of the uterus. A sessile cyst of the broad ligament may at its commencement be simulated by an inflammatory focus in the course of peri-metropalpingitis. The history, the course of the disease, and the co-existence of inflammation of the tubes and uterus will guard

* Poupinel. On the generalisation of epithelial cysts and tumours of the ovary, Thesis, Paris, 1886.—A. Hadjes. Contribution to the study of the generalisation of cystic mucoid epitheliomata of the ovary, Thesis, Paris, 1889.

† Hofmeier. Obst. and Gyn. Soc. of Berlin, Jan. 28, 1887 (Centr. f. Gyn., 1887, p. 179).

‡ Cohn. Ibid.

§ Leopold. Ueber die Häufigkeit der malignen Tumoren und ihre operative Behandlung (Deutsche med. Woch., 1887, No. p. 61).

us against mistakes. These tumours, moreover, are less well limited, more sensible on pressure, and subject to rapid variations in size. A pelvic hæmatocele of small size is fluctuating at first, but does not give to the finger an impression of being an encapsuled tumour, especially at the sides, where it is always somewhat diffuse; the tumour afterwards becomes hard; lastly, its mode of appearance and the intense peritoneal reaction that it occasions at its formation are very characteristic. The extra-peritoneal variety may be very difficult to distinguish otherwise than by its course, which leads to its gradual absorption, from a commencing cyst of the broad ligament. Tumours of the Fallopian tubes—particularly hydro-salpinx—may give rise to considerable doubt. If the lesion be bilateral, the probability is that it is not ovarian cyst, but there are cases in which no real diagnosis can be made until the abdomen has been opened, which is the treatment indicated in both cases. Extra-uterine pregnancy* at the commencement presents but few distinctive signs, though it is usually accompanied by amenorrhœa, and by a congested condition of the generative mucous membranes; later, it presents the special characters that will be considered in another chapter. Retroflexion of the gravid uterus at the third and fourth months can only be suspected if there are signs of commencing pregnancy, and if the tumour be situated in the posterior cul-de-sac, and provoke acute compression-symptoms (retention of urine, constipation), and lastly, if it be solid, and be continuous with the cervix, which is carried very far forward; attempts at reduction will succeed in clearing up all doubts. It must be remembered that care should always be taken to make out the exact position of the uterus before concluding that a tumour is independent of that organ. I only speak of fæcal tumours to put the reader in mind of them.

B. *The tumour has become abdominal.*—Pregnancy† must be placed in the fore-front, for it is of all mistakes the one that

* F. Vulliet (Arch. f. Gyn., 1884, vol. 22, p. 427 and foll.) has related a curious case of extra-uterine pregnancy, seeming to have developed in the interior of a pre-existing tubo-ovarian cyst. The ovarian tissue spread out over the cyst-wall must have been still capable of forming follicles, one of which must have been impregnated.

† Metzler, of Leyden (analysed in Centr. f. Gyn., 1889, No. 40, p. 712) has cited a case of an imaginary tumour due to lordosis, for which the surgeon was on the point of performing laparotomy.

would be most fatal. It is particularly when pregnancy is complicated by hydramnios that the mistake is likely to be made, for then one can neither feel the foetus nor hear the foetal heart.* To avoid the possibility of making the opposite mistake



Fig. 357.—Ovarian cyst complicated by pregnancy.

O T, ovarian tumour pushed outside the pelvis by U, the uterus, which is thrust down upon the walls of the pelvis; F H, spot for auscultation of the foetal heart.

of taking a cyst for a gravid uterus, signs of probability must never be relied upon, but signs of certainty must be sought; we must remember that amenorrhœa, swelling of the breasts, and

* A. Iversen (in Howitz, *Gyn. og obst. Meddel.*, 1888, vol. 7, p. 63) has published an instructive case bearing on this subject. The woman was 39 years of age, and had borne 10 children. The tumour was freely movable, and fluctuation was very evident. It was thought to be a cyst, but laparotomy showed that it was a 5 months' pregnancy, with elongation of the supra-vaginal cervix and hydramnios; death from peritonitis.—I have myself seen a similar case, and made a small exploratory incision which allowed of my making certain a diagnosis that had remained doubtful, in spite of careful watching. The pregnancy was not interfered with, and proceeded normally. The patient, who probably wished to abort, complained of severe pains from compression, and this led me to temporise no longer.

even a false subjective sensation of foetal movements (produced by borborygmi) may be present with tumours of the ovary. Perception of these movements and of the heart-sounds, undoubted determination of the foetal parts, sensations of rhythmical contraction of the gravid uterus (Braxton Hicks), ballottement, and towards the end of pregnancy the engagement of some portion of the foetus in the pelvis, will alone make the diagnosis certain.* The use of the uterine sound is both dangerous and futile. It must be remembered that pregnancy and ovarian cyst may both be present, and this greatly complicates the task

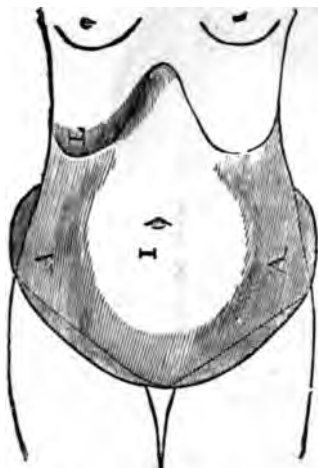


Fig. 358.—Topography of the dulness in a case of ascites.

I, intestinal resonance; L, liver dulness; A A, dulness in the flanks.

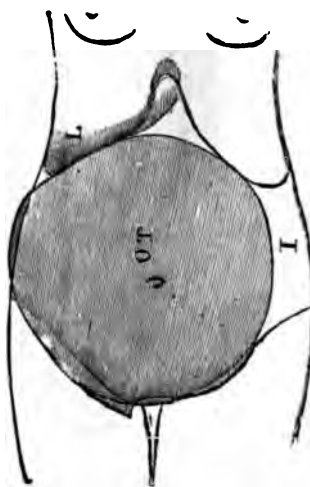


Fig. 359.—Topography of the dulness in a case of ovarian cyst.

I, intestinal resonance; L, liver dulness; O T, dulness over the ovarian tumour.

of the practitioner; he must then apply himself to finding out exactly the fluctuation portions, and to studying the position of the foetus with the assistance of auscultation and palpation. It is, moreover, infinitely more serious to think that a cyst is present, when really the case is one of pregnancy, than to fall into the opposite error;† and when in doubt, one should always

* Pinard. Art. Pregnancy in the *Encycl. Dict. of med. sciences*, Paris, 4th ed., vol. 11.

† This mistake was made, and ended fatally for mother and child, at the Jassy hospital, in a case that drew much attention. Seven months' pregnancy taken for a cyst (*France méd.*, March 27, 1886).

temporise. It is needless to remark that exploratory puncture is always incomparably more dangerous than exploratory incision.*

Ascites can only simulate a very large cyst, filling the abdomen and having indistinct limits. I will just mention the distinctive signs of the effusion of fluid into the peritoneum: the belly is more spread out and less pointed than in the case of a cyst, the dulness occupies the dependent parts, and limited by a concave line above (figs. 358 and 359). When the patient lies on her side, dulness is found in the flank and in the iliac fossæ, while the opposite side, previously dull, now becomes resonant; this displacement is quite characteristic when it can be well made out; the same holds good with the sensation of fluctuation transmitted from one side of the belly to the other. But other cases are more difficult; they are those in which the ascites being rapidly poured out, the belly is tense, the skin stretched, glistening, smooth, and cannot be depressed, and a sensation of undulation and of return shock is rather given than a distinct sensation of fluctuation. Dulness may then not be systematically confined to the dependent portions, while the abdominal contents are even sometimes of very variable consistency, and may only become displaced with great difficulty under alterations in position (Duplay).† But then the extreme rapidity of the increase of size of the abdomen, the constant œdema of the lower extremities, the accompanying derangement of general health dependent upon the primary disease, and lastly, the absence of a limited tumour, found at some previous period, will constitute facts that will guide the practitioner aright. One sign that should always be sought for, is the mobility of the uterus, which persists in ascites, but is abolished with large cysts. Finally, the condition of those viscera (liver, heart), disease of which most frequently gives rise to ascites, must be inquired into.

It is especially in the symptomatic ascites of tubercular or of

* Taignot (Paper on Dropsy of the ovaries in the *Journal d'Expérience*, 1840, p. 55) reported a case of death in a young woman thus tapped by mistake. No doubt many others have not been published.—Olshausen (*loc. cit.*) having performed laparotomy, and, recognising his mistake, re-closed the belly, but induced labour by puncturing the membranes. The patient recovered.

† Vide Gundelach. On ascites symptomatic of ovarian tumours. Thesis, Paris, 1887, p. 44.

cancerous peritonitis that the greatest difficulty may be experienced. For dropsical fluid in the peritoneum may then be encysted by adhesions. In the first case, the accompanying signs of intestinal and pulmonary tuberculosis, irregularity of the abdomen, due to meteorism hindered by the adhesions, and the "intestinal cry" (Guéneau de Mussy) called forth by palpation will form the chief elements in the diagnosis, while in the case of cancer the presence of irregular masses or of flat wooden cakes in the omentum, their fusion with neighbouring parts, and the rapid cachexia will guide the surgeon.

Aspiration may be of great value in these cases, by allowing an examination of the fluid, and also by rendering palpation of the abdomen, which again becomes flaccid, more easy. Nevertheless it is generally abstained from at the present time, for its many disadvantages have been recognised. If it be decided upon, great care must be taken, the trocar and canula must be perfectly clean, and only small sized instruments must be used; the wound must be carefully closed, and the belly must be rendered immovable. Puncture followed by complete evacuation is infinitely less serious in a large tumour than in a small one, for the great retraction of the emptied sac then prevents the escape of the liquid into the peritoneum. There is every reason to let the evacuation be conducted slowly but completely by means of Potain's apparatus. To complete evacuation, use may be made of a simple syphon, obtained by attaching a long piece of india-rubber tubing to the canula, which is allowed to dip beneath the level of the liquid. The size of the trocar must not exceed that of the instrument used for the evacuation of a hydrocele. The seat of election for puncture is the middle of the line between the linea alba and the antero-superior spine of the ilium, or perhaps the linea alba itself; care must always be taken to previously empty the bladder with a catheter, to make certain of the absolute dulness of the abdomen at the point where the puncture is to be made, and to cleanse the abdominal wall with soap and with sublimate. Examination of the fluid removed generally allows of the formation of a diagnosis; if it be viscid, and coloured brown, green, or black, the characters of the contents of a cyst are immediately recognised; a perfectly clear liquid, not coagulable on heating, will come from a hyaline parovarian cyst of the broad ligament, or from a

hydatid cyst. But there are cases in which this examination still leaves one in doubt: they are those in which the liquid is tenacious, yellow or amber in colour, or only blood-stained; ascites and certain cysts present similar characteristics. I have spoken above of the hopes that had been raised by the discovery of paralbumin and of their overthrow.*

Palpation of the abdomen, performed after aspiration, with great care, yields most valuable information; an ovarian tumour may be now recognised, and any other alterations of the viscera, which had formerly been masked by the collection of fluid, can be made out. It must not be forgotten that ascites may complicate a cyst, that has either ruptured or else being papillary, has ceased to limit the vegetations to its internal surface. This condition is indicated by the combined signs of the two lesions. We may then obtain the peculiar sensation of ballottement, dependent upon the fact that the cyst floats in the ascites just like a piece of ice floats on the surface of water.

Puncture of a cyst is by no means necessarily a harmless operation, even when performed with the greatest precautions. Incomplete evacuation may be followed by escape of the liquid into the belly and fatal peritonitis; † neglect of antiseptic precautions, or some unknown circumstance, may lead to suppuration of the cyst. This result has been particularly noticed in the case of dermoid cysts; I have seen one example of it which recovered after ovariectomy. Serious hæmorrhage from injury to large vessels in the walls of the abdomen, or of the cyst, has also been observed. Lastly, the weakening of the cyst wall

* Nevertheless the determination of this question gives some valuable information. If paralbumin be present, the probability, on the whole, is that the case is one of a cyst. In the same way (though this is not pathognomonic either) if the fluid coagulate spontaneously, the chances are in favour of its being ascitic. Klob, Martin, Westphalen, Scanzoni, Olshausen (*loc. cit.*), have nevertheless seen spontaneous coagulation occur in ovarian fluid. A proportion of solid residue, exceeding 100 grammes per litre, favours the cystic view (Mehu, Quenu). Microscopic examination, upon which Spiegelberg and Waldeyer place great importance, shows in ascitic fluid, amœboid cells, pavement epithelium, blood corpuscles, but never cylindrical epithelium, which, on the contrary, is met with in the case of glandular cysts. With regard to papillary cysts, the anatomical elements contained in their fluid are generally quite unrecognisable.

† Mary Putnam Jacobi (*Amer. Journ. of Obstet.*, 1883, p. 1160) has published two cases of death by escape of the contents of dermoid cysts into the peritoneum after aspiratory puncture.

that results from the puncture may favour the emergence of papillary vegetations and peritoneal infection.*

Uterine fibroids have often been simulated by cystic tumours of small size, comprising few secondary cysts, and having gelatinous contents, the elastic consistency of which is analogous; this mistake has especially been made when the absence of a pedicle made the tumours participate in movements imparted to the uterus. Anæsthesia often allows the recognition of fluctuation which otherwise would not be revealed. Considerable pains ought then to be taken to find it out by bimanual palpation, and to determine exactly the connections of the tumour with the womb. Lastly, very considerable augmentation of the length of the uterine cavity, determined by the sound, is in favour of fibroid; nevertheless an increase of from two to three centimetres may be produced by the rising of the ovarian tumour into the abdomen, and its traction upon the uterus. Fibro-cystic tumours of the uterus are very likely to cause error. It must not be forgotten that the first cases of abdominal hysterectomy were performed in the belief that ovariectomy was being undertaken.†

Hæmatometra is distinguished by its seat and its special causes.

Distension of the bladder has been the cause of innumerable mistakes that could always be avoided by personally passing the catheter before every examination. In one case that I saw, the distended bladder reached up to the epigastrium; I had been called in to puncture this so-called cyst, which was present in a woman affected with general paralysis. Spencer Wells, Atlee, and Emmet have related remarkable cases of this distension.‡

Renal tumours, hydronephrosis, hydatid cysts, &c., have given rise to confusion. One should endeavour to make out the fixation of the tumour in the hypochondrium, its termination below which allows of the hand being pressed well down beneath it,

* Westphalen. Beiträge zur Lehre von der Probeponction (Arch. f. Gyn., 1875, vol. 8, p. 72).

† W. L. Atlee. General and differential diagnosis of ovarian tumours. Philadelphia, 1875.

‡ T. A. Emmet (New York Med. Journ., 1884, vol. 39, p. 138) has published a case in which a mistaken diagnosis had been made, and in which the surgeon had let the catheter escape into an enormously distended bladder.

and above the pubis; the interposition of the intestines, and, in particular, of the colon between the tumour and the abdominal wall. When the tumour fills the whole of the abdomen, these differential signs are wanting; even then, however, the situation of the colon in front of the tumour preserves its importance (Nélaton). It has been recommended, in order to bring out this sign more distinctly, first of all to empty the tumour partially by puncture, and then to give effervescing enemata capable of distending the large intestine with gas (Simon). Pawlik* attaches great importance to the persistence of the characteristic shape of the kidney after puncture. If the development of the tumour date from infancy, it is in favour of hydronephrosis, and of malignant disease of the kidney. The presence or absence of pus, blood, &c., in the urine should be made out. Exploration of the kidney region by means of the hand introduced completely into the rectum has yielded valuable information (Fraenkel), but is somewhat dangerous, unless the surgeon be gifted with an exceptionally slender and supple hand. Lastly, examination of the liquid removed by puncture often solves all doubts, but, on the other hand, may still further increase them in cases where the liquid is not characteristic. Urea may be absent from hydronephrotic and be present in ovarian cysts; the same may occur with uric acid. Nevertheless the presence of a large amount of these compounds would be decidedly in favour of a renal change. As a last resource, catheterisation of the ureters by Pawlik's or Simon's methods should not be neglected.

I shall not dilate upon hepatic and splenic tumours (cyst, hypertrophy) on account of their rarity; a diagnosis, when it is difficult, can only be made by careful consideration of the connections, sometimes only after exploratory incision. Mesenteric† and omental tumours (cysts, lipomata), and hydatids in the abdominal cavity‡ will generally only be recognised after puncture or exploratory incision. The latter method is preferable.

* Pawlik. Ueber die Differentialdiagnose zwischen Nieren und Eierstocksgeschwülsten und ein neues diagnostisches Merkmal (Centr. f. Gyn., 1887, No. 85, p. 560).

† Coppens. Bull. méd., Jan. 11, 1888, p. 85.

‡ Witsel (Beiträge zur Chirurgie der Bauchorgane in Deutsch. Zeitschr. f. Chir., 1885, vol. 21, p. 189) remarks that then it is almost impossible to avoid confounding with ovarian cysts, before laparotomy.

Tumours of the abdominal walls have given rise to mistakes which, it seems to me, might always have been avoided by an examination performed with the assistance of an anæsthetic.*

Pseudo-cysts, phantom-tumours.—Tympanites associated with partial contraction of the abdominal muscles, and with a localised increase in adipose deposit, may give rise, particularly in hysterical women, to the most curious and improbable mistakes. The abdomen has often been opened under these conditions, and even more often it has just escaped opening.† In a case of Krukenberg's,‡ it was lordosis that caused the mistake. An exceptional case was that of Reeves Jackson's,§ where puncture was first performed, and afterwards laparotomy, under the belief that the case was cystic, whereas really it was a case of enormous dilatation of the stomach; the error was even carried so far as to the opening of this organ. The patient died.

The best method of avoiding mistakes in doubtful cases is to anæsthetise the patient, and then to palpate and percuss with the greatest care.

Exploratory incision.—When every other means of diagnosis has proved insufficient, is the surgeon justified in opening the abdomen with the object of making out the nature of the tumour, and of operating at the same time if it be possible? On this point Lawson Tait|| is categorical. He always substitutes incision for exploratory puncture; out of 94 exploratory incisions he has had only two deaths. He makes a very small incision, only large enough for the insertion of two or three fingers; to this fact, no doubt, is due the exceptional benignity of his practice. Terrillon,¶ in the more extensive review that he has published of cases from various sources, found 21 deaths in 100 cases, a proportion which seems to me to have become too high, if we consider the actual progress that has been made in the technique itself. In point of fact, it must be remembered that under the name of "exploratory incision" employed euphemistically, a great number of incompleated operations have been published. Now since at a period which even now has

* Rob. F. Weir. Med. Record, Dec. 3, 1887, vol. 32, p. 703.

† Atlee, Spencer Wells, Olshausen, *loc. cit.*

‡ G. Krukenberg. Arch. f. Gyn., 1884, vol. 23, p. 139.

§ A. Reeves Jackson. Detroit Lancet, Jan., 1880 (Anal. in Centr. f. Gyn., 1880, No. 15, p. 368).

|| Lawson Tait. B. M. J., 1885, vol. 1, p. 218.

¶ O. Terrillon. Bull. et Mém. de la Soc. de Chir., 1885, p. 168.

not completely elapsed, incision of the belly alone was regarded as very serious; when it had been done, surgeons could scarcely bring themselves to closing up the abdomen without making an attempt at removing the tumour, and that even under conditions where at the present day we should desist. As a consequence, the statistics look much darker than they should. Personally, I am strongly in favour of exploratory incision, when it alone seems able to clinch the diagnosis.

Diagnosis of the variety of cyst.—This question may be solved by the considerations which have already been given at length; I shall here only briefly indicate the chief points.

A very large and very bossy tumour, with unequal consistency of the bosses, is a glandular cyst. The presence of ascites (in the absence of symptoms indicating rupture), a sensation of irregular and papillary masses in Douglas' pouch, together with the presence of the tumour on both sides, would give rise to a diagnosis of papillary cyst. Very marked fluctuation over the whole extent of the tumour, slow progress, almost perfect preservation of general health in spite of the great size of the tumour, intimate connection of the latter with the uterus, so that the cyst may appear to be enclosed between the layers of the broad ligament or only provided with a short pedicle, are characteristic of a hyaline parovarian cyst. The possibility of feeling the ovary and tube on the side of the tumour has been noted in such cases as being pathognomonic. With regard to dermoid cysts,* the possibility has been pointed out of making impressions with the finger upon the tumour, filled as it is with a semi-solid fatty material, or even of perceiving the grating of the hair that they contain.†

Diagnosis of adhesions.—To find out whether parietal adhesions are present, Spencer Wells considers whether change in the patient's position or respiration alters the position of the tumour. By displacing the abdominal walls in front of the tumour one ascertains whether the umbilicus glides over it easily, or whether friction or a creaking sound like that produced by new leather is produced; the latter indicates that a certain amount of adhesive peritonitis has occurred.

* Leopold. Dresden obst. and gyn. Soc., Nov. 5, 1885 (Centr. f. Gyn., 1886, p. 30).

† Kocher. Ein pathognomisches Zeichen zur Diagnose der Dermoiden (Centr. f. Chir., 1887, p. 44).

A tumour that has long been of considerable size is very likely to have contracted adhesions to the anterior abdominal wall or to the great omentum, unless there has been present at the same time a certain amount of ascites. Adhesion to the viscera can only be suspected if there have been external symptoms of acute peritoneal inflammation following on aspiration, twisting of the pedicle, or rupture.

CHAPTER III.

THE TREATMENT OF OVARIAN CYSTS.

Medical treatment.—Puncture through the abdominal wall, through the vagina, through the rectum.—Injection of iodine.—Drainage.—Ovariectomy.—Historical survey. General indications. Malignant degeneration. Age. Method of performing the operation. Instruments. Assistants. Various stages of the operation. 1st stage: opening the abdomen. 2nd stage: breaking down of adhesions, evacuation. 3rd stage: extraction of the cyst and ligation of the pedicle. 4th stage: toilette of the peritoneum and closure of the abdomen.—Enucleation of cysts enclosed between the layers of the broad ligament and retro-peritoneal cysts.—Incomplete operations: marsupialisation.—Dressings. After treatment.—Accidents. Internal hæmorrhage. Paralysis of the gut. Secondary opening of the wound. Emphysema. Superficial abscess. Deep abscess. Parotitis. Peritonitis. Intestinal obstruction. Tetanus. Phlebitis. Embolism. Uræmia. Shock.—Statistics of the operation.—Sequelæ. Recurrence. Menstruation and fertility after operation.—Insanity after operation.—Cysts complicating pregnancy; ovariectomy during pregnancy.

I SHALL not stop to consider medical treatment at all; it has been responsible for the deaths of many women, whom it has prevented from undergoing operation at the proper time. Diuretics and diaphoretics, mercurial and iodine preparations, ergot of rye, &c., all owe their so-called success to a failure to recognise that the disease may undergo periods of arrest. The only rational internal treatment is the tonic and the exhibition of stomachics and gentle purgatives to improve, as far as possible, the digestive functions. Electrolysis, which has been so much misused in gynæcology, is here both useless and dangerous. Every recognised ovarian cyst ought to be removed, if removal is practicable.

Puncture through the abdominal wall has also frequently been resorted to, not as a cerative means, but too often as a palliative before ovariectomy became the general rule. Some women thus underwent an almost unheard-of number of evacuations of the cyst. The surgeon may be compelled to undertake this operation from necessity in cases where there are extreme compression

symptoms, or, again, in cases where a complete operation is impossible. He would then, by choice, thrust the trocar through the linea alba or into the iliac region over a spot where absolute dulness had previously been recognised to exist, by percussion. Puncture of a cyst when there is no absolute necessity, and when it is possible to remove it entirely, is always bad practice. The patient is thereby exposed to the risk of serious peritoneal accidents, and at the lowest estimate one always runs the risk of leading to the formation of adhesions. It has been suggested to make an exception in the case of unilocular cysts of the broad ligament with thin walls and transparent contents, viz., hyaline parovarian cysts.* But against a few cures that have been obtained (the after-history of which has in some cases not been followed for a sufficient length of time) one is obliged to set a very large number of recurrences. Moreover, puncture is absolutely dangerous from the point of view of the metastatic generalisation of papillary cysts of the broad ligament, which it is almost impossible to distinguish from simple serous cysts, before opening the abdomen.

If, on the other hand, we consider the comparative harmlessness of ovariectomy in cases of this kind, we shall not hesitate to give to it the preference, and renounce a doctrine which has only yielded a few successful results, and has been the cause of innumerable mishaps. Puncture has generally been performed through the abdominal wall; but it has also been performed through the vagina in cases where the tumour, being small, was more easily accessible through this canal. It is a dangerous procedure on account of the facility of secondary infection, and of serious suppuration, particularly if the case be one of dermoid cyst. Tavignot does not fear to recommend puncture through the rectum; the operation is simply abominable.

Injection of iodine, recommended by Boinet† with extreme enthusiasm, at the present day scarcely counts a single supporter; it is only adopted by a very few surgeons even in the treatment of unilocular cysts with thin walls. In these cases it is a much more serious operation than ovariectomy, and

* Panas. *Bull. de l'Acad. de Méd.*, March 18, 1876.

† Boinet. *Bull. de Thérap.*, August 1852, vol. 43, p. 161.—*Bull. de l'Acad. de Méd.*, 1852, p. 165.—*Iodotherapie*, 2nd edit., 1865.—Discussion at the Acad. of Med. (*Bull.*, 1856, vol. 22, p. 20 and foll.).

was only useful at a time when ovariectomy was still considered a rash operation. Drainage after puncture or incision* was about the same period applied to cysts, complete extirpation of which would, however, have been perfectly easy; it has led to a few recoveries, but in a much larger number of cases death occurred from hectic and infection. Drainage at the present time should only be resorted to in the treatment of the remnants of cysts which could not be completely removed, as I shall subsequently have to describe, or when a suppurating cyst, for which no radical operation is possible, has spontaneously opened externally.

Ovariectomy. Historical survey.—It was Ephraim MacDowell (of Kentucky), a pupil of John Bell (of Edinburgh), who first performed ovariectomy for an ovarian cyst in 1809.† The pedicle was returned into the abdomen, and the patient recovered. It was also an American, Nathan Smith (of Connecticut) who performed the second operation. Alban Smith was the third. His first successful cases dated from 1827.‡

But after that there were only a few cases of extreme rashness in operation, which did not conduce to its repetition.

J. L. Atlee§ had performed in 1843 the first double ovariectomy, and in the following year Washington L. Atlee,|| who must not be confounded with the former, commenced his remarkable series of operations, which numbered 246 in October, 1871. Ovariectomy was completely acclimatised in America after 1865 (Peaslee).

In England, Lizars (of Edinburgh), inspired by MacDowell's

* The first incision of an ovarian cyst was performed by Houston (Philosoph. Trans., 1724, vol. 33).—Le Dran, in 1757, performed the same bold operation and gave rules for its performance (Mém. de l'Acad. de Chir., vol. 3, p. 431).

† The first ovariectomy has been wrongly attributed to Abraham Cyprianus. This surgeon simply opened a suppurating foetal cyst, the result of an extra-uterine pregnancy. The history of this case may be found in A. Cyprianus, Letter reporting the history of a human foetus of 21 months, &c., Amsterdam, 1707.—What seems to have caused Ladouce's mistake (Contribution to the study of sarcoma of the ovary. Thesis, Paris, 1890) when he took this as being the first published case of ovariectomy is the allusion made to it, when considering ovarian cysts and the adhesions they may contract, by J. B. Morgagni, De sedibus et causis morborum, &c., 1761, 18th letter. (French trans. by Desormeaux and Destouet, Paris, 1820-1824, vol. 6, p. 195.)

‡ E. MacDowell. Eclectic Repository and Analyt. Review. Philad., April, 1817, p. 242.—N. Smith, Amer. Med. Rec., June, 1822, vol. 5, p. 124.—A. Smith, North Amer. Med. Surg. Journ., Jan., 1826, vol. 1, p. 80.

§ J. L. Atlee. Amer. Journ. of Med. Sciences, 1844, vol. 7, p. 48.

|| W. L. Atlee, *ibid.*, 1855, vol. 29, p. 387.

cases, opened the abdomen in 1824 in consequence of an error in diagnosis, and the following year for ovarian cysts, of which he cured 1 in 3. Granville (of London) met with two fatal cases that discouraged him, and until 1842 the operation fell into disrepute. Walsh and Clay again brought it into repute by a remarkable series of successes. Later came those of Bird and Baker-Brown, and lastly those of Spencer Wells (1858).*

In Germany, Chrysmann, in 1820, made an unsuccessful attempt at the operation. Some isolated operators, amongst whom Stilling may be mentioned, ventured upon it later, but the operation was not definitely taken up.†

In France, Woyerskowsky (1844) performed the first ovariectomy. In 1856 the operation was condemned by the Academy of Medicine, with the sole exception of Cazeaux. In 1862 Nélaton went to see Spencer Wells operate, and on his return performed ovariectomy, but without success. But Koeberlé, in 1864, published 9 cures out of 12 cases; then Péan showed in a striking manner that the operation could be successful in Paris. It is to these two authorities that ovariectomy owes its generalisation in France.‡

At this time the appearance of the antiseptic method made the operation enter upon a new phase, and caused it to pass from the hands of a few eminent specialists into the hands of every surgeon.

In a word, ovariectomy has gone through three successive phases: 1. A groping phase, instituted in America by W. L. Atlee, in England by Baker-Brown and Spencer Wells, and in France by Koeberlé and Péan; 2. A very short phase of extreme specialisation with which the names of the initiators that I have just mentioned are connected; 3. A phase of generalisation owing to the powerful impulse of antiseptics.

General indications.—At the present day this paragraph may

* LIZARS. Observation on the Extraction of diseased ovaria. Edinburgh, 1825.—C. CLAY, *Med. Times*, 1848, vol. 7, p. 43, &c.—Result of all the operations for extirpation of diseased ovaria by large incision, London, 1848.—SPENCER WELLS. History and progress of ovariectomy in Great Britain (*Med. Chir. Trans.*, 1863, vol. 46, p. 88).

† PAUL GRENSER. Die Ovariectomie in Deutschland, historisch und kritisch dargestellt. Leipzig, 1870.

‡ OLSHAUSEN. *Loc. cit.*—KOEBERLÉ. *Gaz. hebdomadaire*, July 13, 1866, p. 486.—PÉAN. Can ovariectomy be performed in Paris with reasonable hope of success? (*Union méd.*, 1868, Nos. 125-145, and *Bull. Acad. de Méd.*, 1868, vol. 33, p. 418.)

be considerably shortened, for many points that until lately were debated* have now become settled. Some surgeons, relying on the possibility of the cure of hyaline parovarian cysts after simple puncture, a cure which, according to the statistics (perhaps somewhat optimistic) of Terrillon,† is observed once out of every three cases, advise in such cases a first attempt with puncture, and the adoption of ovariectomy only if there be recurrence. No doubt this course would be wise if one were absolutely certain of never confounding a hyaline with a papillary cyst. But since this diagnosis, before puncture, is sometimes impossible, and since puncture under the last-named conditions is extremely dangerous, it seems to me to be always preferable to perform ovariectomy from the very first, and this operation, it cannot be too much insisted upon, is, in these simple cases, quite innocent.

At the present time, therefore, it can no longer be said that laparotomy ought only to be performed when the cyst, by its size, has become a great trouble to the patient or an imminent danger to her life. As soon as a commencing tumour of the ovary is recognised it must be removed, firstly, because the operation in itself is then much less serious, since a small incision is possible and there are no considerable adhesions to be broken down; secondly, because the patient thereby escapes the later dangers of inflammation, of rupture, and of twisting of the pedicle; and thirdly and chiefly, because every ovarian cyst is, so to speak, a new growth in instable equilibrium between benignity and malignancy. Cohn,‡ out of 658 cysts removed by Schröder, found 100 of them, or 15·1 per cent., in a condition of malignant degeneration. Leopold§ has counted 26 out of 116 (or 22·4 per cent.) Schultze|| out of a short series of 33 cases found 9 malignant, or 27 per cent. This proportion is perhaps somewhat high, because these eminent operators have especially been resorted to for serious and difficult cases. Nevertheless

* S. Duplay. The indications and contra-indications for ovariectomy (*Ann. de gyn.*, 1879, vol. 2, p. 208).—It is interesting to appreciate the great strides that have latterly been made, to compare the conclusions in this paper with those set forth by Chazan before the Dresden Gyn. Soc. (*Centr. f. Gyn.*, 1887, p. 454).

† O. Terrillon. *Annal. de Gyn.*, 1885, p. 426.

‡ E. Cohn. *Zeitschr. f. Geb. u. Gyn.*, 1886, vol. 12, part 1, p. 14.

§ Leopold. *Deut. med. Woch.*, 1887, No. 4, p. 62.

|| B. S. Schultze. *Corresp. des allg. ärztl. Vereins von Thüringen*, 1887, No. 3.

one cannot doubt that it is an indication of the frequency of the malignant degeneration of cysts. Poupinel's* work tends in the same direction. Now, to operate for a cyst that has already undergone this degeneration is a much more serious matter, and only gives a respite to the patient and not a cure.

This change of character of the growth is always to be feared when the tumour, after having long remained stationary has undergone a rapid and unexpected increase in size during the course of a few months. But even when one has been able to form a diagnosis of malignancy, the surgeon should not abstain from operating. Cohn found that of 86 patients operated upon under these conditions 19·5 per cent. were still in good health at the end of a year, and in 5 cases recovery continued uninterrupted at the end of from 3 to 4½ years. These results allow of no hesitation. Freund† has arrived at the same conclusions. One of the most remarkable cases of peritoneal metastasis in a case of glandular cyst followed by recovery after laparotomy has been published by Runge.‡ The woman was forty years of age, the tumour had developed in 5 months, and the peritoneal cavity contained over its whole extent gelatinous masses similar to those which filled the sac. The recovery from this tumour, which was evidently malignant, was, however, maintained for six months.

Nevertheless the surgeon must bear in mind that cruel miscalculations may await him, and that a recurrence with galloping progress may carry off the patient in a few days. Hofmeier§ relates two cases seen by him in which the patients succumbed thus, one 17 days and the other 25 days after ovariectomy. In the first case, at the operation not the slightest trace of generalisation had been found in the peritoneum, but nevertheless the whole of the serous membrane was covered by a layer of carcinomatous tissue as thick as the finger, and the whole of the omentum was converted into a hard and thickened mass, so that it seemed well-nigh impossible to believe that a

* Poupinel. On the generalisation of epithelial cysts and tumours of the ovary. Thesis, Paris, 1886.

† H. W. Freund. Ueber die Behandlung bösartiger Eierstocksgeschwülste (*Zeitschr. f. Geb. u. Gyn.*, 1889, vol. 17, part 1, p. 150).

‡ Runge. Fall von glandulären Ovarialcystomen mit gelatinösem Inhalt und peritonealen Metastasen (*Centr. f. Gyn.*, 1887, No. 15, p. 233).

§ M. Hofmeier. *Grundriss der gynäk. Operationen*, 1888, p. 285.

few days previously it had been found healthy. In the second case metastatic formation had already begun at the time of the operation.

It is impossible, as I have said, to separate from papillary cysts of the ovary those solid tumours wrongly called papillomata, which are generally only papillary cysts that have ruptured into the peritoneum. In this last stage of their evolution the papillary cysts, reduced to their solid portion, complicated by ascites induced by irritation of the peritoneum, into which they cast their shed epithelium, sowing around them fragments that take root anywhere on the peritoneal surface, have positively taken possession of the peritoneum and have converted it into a cystic cavity. Even at this period laparotomy may lead to a comparative cure of these tumours, which ovariologists, even until quite lately, regarded as positive cases of *noli me tangere*: a comparison might be instituted between these unexpected good results and those which laparotomy has yielded in certain cases of tubercular peritonitis. Knowsley Thornton* has related a cure of this kind of 9 years' duration; Leopold† one of 2 years' duration; Cohn,‡ a case of Schröder's of 2½ years' duration. Freund§ has also seen lasting recoveries. Lomer|| has published a remarkably interesting case; small papillomatous excrescences existed upon the omentum, from which it was possible to remove them, on the intestine and the parietal peritoneum, whence they could not be removed; recovery, however, was maintained five years after the operation. I myself¶ operated on a case, with Terrier's assistance, that was quite similar, twelve years ago, and the patient is at the present time in perfect health. These lesions, therefore, must not be considered as beyond the resources of surgery, although their prognosis cannot in the least degree be foreseen, and is dependent upon factors that up to the present are quite unknown.

* Knowsley Thornton. Trans. Obst. Soc., Lond., 1886 (Schmidt's Jahrb., 1887, vol. 215, p. 257).

† Leopold. *Loc. cit.*, p. 61.

‡ E. Cohn. *Loc. cit.*, p. 14.

§ W. Freund. *Loc. cit.*

|| Lomer. Doppelseitiges Papillom des Ovarium mit Ascites und ausgebreiteter Infection des Peritoneum; dauernde Heilung durch Laparotomie (Centr. f. Gyn., 1889, No. 52, p. 906).

¶ S. Pozzi. Four ovariectomies, &c. (Gaz. méd. de Paris, 1879, p. 130).

The age of the patient is no contraindication. Operations have been performed with success upon very young children; Roehmer* removed a dermoid cyst from a child aged 20 months; Schwartz† operated on a little girl aged 4 years. Mears and Barker‡ have operated for ovarian tumours on children of 6 and 6½ years. Thornton, Lucas, Hamaker,§ Cupples, Chenoweth,|| on children of 7 and 7½ years. Spencer Wells, Mackenzie, and Duchamp¶ have performed ovariectomy on little girls of 8 and 8½ years, Polotebnoff on one of 9 years, and Wagner** on one of 10 years. The patients of Barlow and Marsh,†† of Jouon,‡‡ of Henricius,§§ and McGraw||| were 12 years of age; those of Bolling, Cavafy, Bell, and Cameron¶¶ were aged 13 years. Bryant*** long ago published a case of ovariectomy in a young girl 14 years of age.

On the other hand, very old women have been cured by operation. Nevertheless the surgeon has always to be on his

* Roehmer (of Berlin). Ovariectomy bei einem 1 Jahr 8 Monate alten Kinde. Heilung (Deut. med. Woch., 1883, No. 52, p. 762).—Chiene (Edinb. Med. Journ., 1883, vol. 29, p. 1132) seems to have operated successfully on a child three months old. It appears as if this case were one of hernia of the ovary, rather than of an ovarian tumour.

† Schwartz. Arch. f. Gyn., 1878, vol. 13, p. 475.

‡ J. E. Mears. Philad. Med. Times, 1871, vol. 2, p. 44.—W. B. Barker, cited by Chenoweth. Amer. Journ. of Obstet., 1882, vol. 15, p. 628.

§ J. K. Thornton. B. M. J., 1881, vol. 2, p. 933.—B. C. Lucas. Med. Press and Circ., May 2, 1888, vol. 96, p. 459.—W. D. Hamaker. A case of ovarian tumour in a girl seven years old; ovariectomy, recovery (New York Med. Journ., Sept. 14, 1889, p. 288).

|| G. Cupples. Excision of an ovarian cyst from a child seven and a half years old (Richmond and Louisville Med. Journ., 1874, p. 658).—W. J. Chenoweth, *loc. cit.*, p. 625.

¶ Sp. Wells. Ovariectomy successful in a girl eight years old (B. M. J., 1874, vol. 1, p. 432).—W. G. Mackenzie, Dublin Journ. of Med. Science, Oct. 1888, vol. 86, p. 302. (This case was one of dermoid ovarian cyst).—V. Duchamp. Ovariectomy in a child 8½ years old; recovery (Arch. de Toccol., 1884, vol. 11, p. 23).

** S. M. Polotebnoff. Ejened klin. Gaz., St. Petersburg, 1887, p. 209.—P. Wagner, Arch. fur klin. Chir., 1884, vol. 30, p. 506.

†† T. Barlow and H. Marsh. A case of ovariectomy in a child aged 12 years. (B. M. J., 1878, p. 778.)

‡‡ Jouon, of Nantes (cited in Encycl. Dict., Art. Ovariectomy, p. 304).

§§ G. Henricius. Finska lak. salsk. Handl., Helsingfors, 1888, vol. 30, p. 429.—The cyst had colloid contents.

||| T. A. MacGraw, cited by Chenoweth, *loc. cit.*, p. 627.

¶¶ Bolling. Hygiea, 1887, vol. 49, p. 788.—Cavafy. Lancet, 1886, vol. 1, p. 920.—Bell. Unilocular ovarian cyst in a girl aged thirteen; ovariectomy (*ibid.*, 1887, vol. 1, p. 418).—Cameron. Glasgow Med. Journ., 1888, vol. 31, p. 1.

*** T. Bryant. A case of ovarian disease in a child (Guy's Hosp. Rep., 1869, vol. 14, p. 216).

guard against the evil effects of long-continued restraint to bed (hypostatic congestion of the lungs, bedsores) by making the patients get up and allowing them to sit in a chair at a very early date, following F. Barnes' advice. Johnson* cured a patient aged 64 years. Davis† has published a successful case obtained at the age of 65, Pinnock‡ at 67, Spencer Wells§ at 73, Josephson|| at 76, Terrier¶ at 77, Owen** at 80, and Homans†† at 82 years and 4 months.

Method of performing the operation.—Pediculated cysts.—For the preliminary precautions, I refer the reader to the description that I have given in the early pages of Vol. I.‡‡ Many surgeons only proceed to perform ovariectomy if they are surrounded by a perfect arsenal of instruments: forceps of all sizes and shapes, knives, scissors, retractors, needle carriers, &c. But I believe there is every reason to reduce the number of instruments used to the very minimum, so as to avoid, as far as possible, any chance of infection. It will be enough to have some good knives, some dissecting forceps, a female and a male sound, and a cannulated sound, scissors, one pair of which should be curved, some ordinary artery-forceps, long forceps for adhesions, straight and curved, two pairs of Nélaton's cyst-forceps, a pair of Museux's fixation forceps, a trocar, a pair of needle-forceps, needles and one blunt needle mounted on a handle; lastly, some silk, catgut, and compress sponges are necessary. All these instruments must be exclusively reserved for cases of laparotomy, and have been previously, as I have said, heated for an hour in

* Johnson. *Virginia Med. Monthly*, Richmond, 1888, vol. 15, p. 644.—The tumour weighed 63 pounds.

† Davis. *B. M. J.*, 1887, vol. 2, p. 1050.

‡ Pinnock. *Anstral. Med. Gaz.*, Sydney, 1887, vol. 7, p. 158.

§ Spencer Wells. *Treatise on tumours of the ovary*, French trans., 1888, p. 267.

|| Josephson. *Centr. f. Gyn.*, 1889, No. 47, p. 824.

¶ F. Terrier. *Progrès méd.*, 1888, No. 24, p. 466. This case was one of fibroma and not of cyst of the ovary.

** E. M. Owen. *Brit. Gyn. Journ.*, London, 1888, vol. 4, p. 38.

†† T. Homans. *Med. Record*, New York, May 5, 1888, vol. 33, p. 496.—The tumour was a multilocular cyst, with papillary vegetations. Weight of the fluid, 13 pounds; weight of the solid portion, 1½ pounds. The operation had been indicated by the severe pain.

‡‡ Antisepsis of the alimentary canal, upon which Terrier has laid so much stress, seems to me to be sufficiently assured, before and after the operation, by the administration of repeated purgatives. It is only in exceptional cases, in particular when a collection of pus has been evacuated by the rectum, that I prescribe naphthol and salicylate of bismuth as an energetic intestinal disinfectant.

a stove up to 140°C . They should be placed near the operator, within reach of his hand, and in a flat tray filled with 2 per cent. carbolic solution. It will be advisable, however, to have on a neighbouring table additional instruments of the same kinds, forceps, knives, &c., in case of unforeseen need (fig. 360).

Those surgeons who use sponges, recommended that they should be counted before and after the operation, on account of the ease with which a small sponge, even if mounted on a holder,

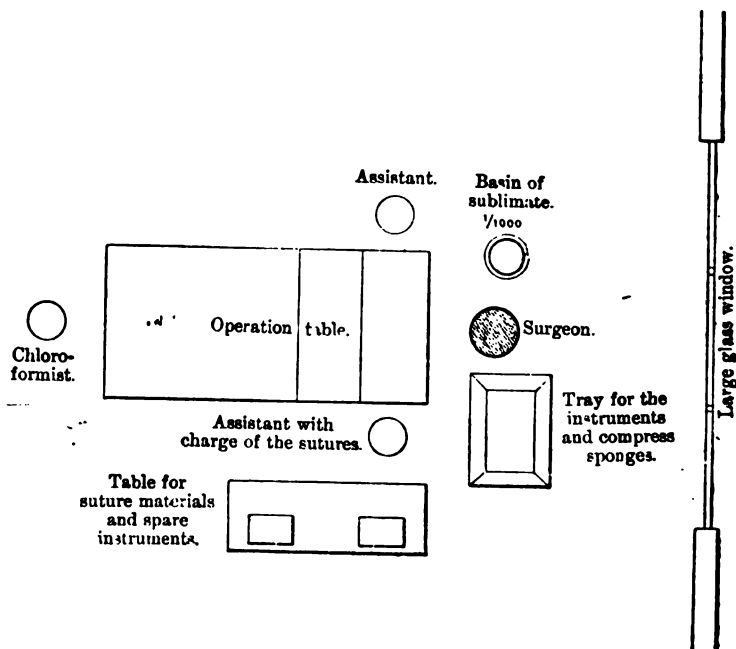


Fig. 360.—Arrangements for the operation of laparotomy.

may, if the latter become loosened, be forgotten in the abdomen. For my part I have completely discontinued the use of sponges, and I do not think that such an accident could possibly occur with the compresses that I use, the end of which is always outside the abdominal wound. However, for greater safety a pair of indicating-forceps, with the branches gilded by preference, should be placed upon them. The precaution of counting the forceps has been of use, and Spencer Wells' case is always cited in which he opened the belly again and removed the missing

instrument. But on the other hand, an opposite error might be thus made if a pair of forceps had slipped into a basin or had been taken away attached to the tumour or to a sponge without being perceived.* It is therefore sufficient, I think, to keep a strict watch over the instruments.

The number of assistants should be as limited as possible: one for the chloroform, one to thread and hand the needles or ligatures (the latter must be cut beforehand and kept in weak carbolic or sublimate solution), and a third experienced assistant to help the surgeon. He ought to stand on the left of the patient, while the assistant having charge of the sutures stands on her right, and consequently on the right of the surgeon, sufficiently close to be able to pass him the ligatures directly. If an experienced assistant cannot be obtained, two are necessary, one on the right hand, the other on the left. Nobody should be allowed to touch any instrument or any other object whatsoever that is to be used during the operation with the exception of the afore-mentioned assistants. If an instrument fall to the ground it should be left there.

The operation of ovariectomy may be divided into four stages:

Stage I. Opening the abdomen.—It is much better to commence by making only a moderate-sized incision, with the option of increasing it later on. While the assistant places his forefinger upon the umbilicus to fix this landmark, and gently draws the skin upwards, the surgeon, with a strong convex knife, makes an incision 10 cm. long over the *linea alba*, reaching nearly to the symphysis below. The skin and the cellular tissue being rapidly divided, an attempt is made to find the interspace between the *recti abdominis* muscles, and this must first of all be sought for at the upper extremity of the wound. If their sheath be opened, the inconvenience is but little important. Immediately after, the surgeon comes down upon the *fascia transversalis* and the sub-peritoneal layer of fat, which must not be confounded with the great omentum. These fatty masses are incised and excised if necessary, and then the peritoneum is reached. Before opening it he must make sure that all bleeding has been arrested, and for that must place two or three artery forceps over the bleeding vessels. The peri-

* H. C. Coe (*Amer. Journ. Obst.*, Feb. 1889, vol. 22, p. 166) on two occasions re-opened the belly to search for a sponge that had fallen into a pail.

toneum is seized with dissecting forceps at the upper part of the wound, and a small button-hole is made in the portion lifted up; a grooved director is introduced from above, below, in the median line, and the peritoneum freely incised by means of the knife or of the scissors. At this point great care must be taken by raising the serous membrane on the director and, if necessary, by looking through it by transmitted light, that an abnormally developed bladder is not wounded.* In some rare cases the peritoneum may be so completely fused with the anterior wall of the cyst that differentiation becomes impossible. The incision must then be prolonged upwards until a point is reached at which the peritoneum is free, and then the two must carefully be separated from above, downwards. This course is infinitely preferable to that of entering directly into the cyst and stripping it off by exerting traction on its internal surface.

Stage II. Breaking-down of adhesions. Evacuation. — A. Adhesions to the abdominal wall.—The right hand is introduced flat into the abdominal wound on the surface of the cyst, and working with its internal border the adhesions right and left are broken down as far as it can reach. Those adhesions which are too tough to yield to simple pressure are easily recognised, and no exaggerated endeavour is made to break them down thus,

* Wounding of the bladder is an accident that has happened to many experienced operators. In cases where the tumour, having developed beneath the serous membrane, has very considerably elongated the bladder, this viscus, when empty, becomes unrecognisable, and may very easily be taken for a thick false membrane. I have myself been obliged to repair this accident in a case where the wound was 20 cm. in length, and included at once the extra- and intra-peritoneal surfaces of this organ. (*Ann. des mal. des org. génito-urin.*, May 1, 1883.) In this case I stitched up the whole of the bladder, leaving a button-hole opening in front, through which I placed a syphon-tube. After the patient had recovered, this orifice was easily closed by a plastic operation. Reverdin's and Säger's later publications warrant an attempt at complete closure. In a case in which he had removed a portion of the bladder, Säger (Congress at Halle, in *Centr. f. Gyn.*, 1886, No. 26, p. 418) sutured it with silk, and fixed it to the lower part of the wound by drawing the peritoneum in front of it; pre-vesical drainage and suture of the abdominal walls above the stump of the bladder; recovery. Leopold (*ibid.*) having removed the summit of the bladder in a case of hysterectomy, sutured the two serous surfaces completely together; his patient recovered. I believe that in such cases it would be advisable to insert two rows of stitches, either interrupted, as in Czerny's method of suturing the intestine, or else by overcasting. I had a most successful case with this method (*Bull. et Mém. de la Soc. de Chir.*, Dec. 1889, p. 786). Silk is preferable in ovariectomy where the pedicle is returned to the abdomen, because one has no cause to fear its secondary infection, as is the case in hysterectomy with an external pedicle that will have to undergo mortification.

but they are reserved till later, when the cyst has been evacuated.

B. *Adhesions to the omentum.*—These are broken down in the same way; if necessary, both hands may be used. Catgut ligatures are immediately placed upon the bleeding points. If certain portions are too closely adherent, they are seized with two pairs of forceps, divided between them and tied immediately in small pieces with catgut. This method of procedure is a great improvement on that by elastic ligature *en masse* adopted by Hegar.

C. *Adhesions with the intestines.*—Soft adhesions may be detached, as in the preceding cases; moderately firm ones yield to combined tension and pressure, directed alternately upon the wall of the cyst and that of the intestine, and always exerted with the fingers covered by compress sponges. If the bowel bleed at a limited spot, one or several interrupted sutures must be inserted with a fine needle and catgut. If hæmorrhage occur from a large surface, an endeavour should first of all be made to overcome it by means of compression lasting for some little time, and if that do not suffice the bleeding spots should be touched with a strong solution of carbolic. Hegar recommends the use, at a distance, of the radiant heat from a thermo-cautery. Lastly, if separation of the intestine seem dangerous, it is much better to give up all attempts, and to proceed as I have already suggested when dealing with the subject under the heading of myomectomy, by leaving a thin layer of the cyst wall adherent to the intestine from which it can afterwards be separated by minute dissection. But it is necessary to cauterise this layer so as to destroy all epithelial elements in it coming from the wall of the cyst. Further, before commencing to detach intestinal adhesions of any extent, their number and importance must always be carefully considered, and if they are too serious it is better to renounce the operation altogether and confine oneself to performing, according to circumstances, an exploratory incision or marsupialisation of the cyst (see below).

D. *Pelvic adhesions.*—In the case of small tumours the surgeon should search for the adhesions before evacuating the cyst; in the case of large tumours it is necessary first of all to diminish their size so as to allow the hand to glide into the pelvic cavity. At the same time, they should be well drawn forward by means

of Nélaton's forceps. A serious mistake that must be avoided would be to take an intra-ligamentous tumour for a cyst bound down by extensive adhesions; such an intra-ligamentous cyst could only be removed after having opened the peritoneal case in which it lies. I shall refer to this point later on.

Pelvic adhesions will be broken down by the hand, and if one be forced to use scissors they must only be cut between two forceps or two ligatures. It may happen that the pelvic portion of the sac is so adherent that it cannot be removed. A partial or incomplete operation, of which I shall later describe the technique, should then be performed.

There is every reason not to evacuate the contents of small cysts before having detached those adhesions that will yield to the hand's pressure; this latter, in point of fact, is exerted much more effectively over a distended than over a flaccid sac, but the division of tough adhesions must be reserved for a time



Fig. 361.—Trocar, with rounded extremity and lateral outflow tube.

when puncture of the cyst and its retraction will allow of its being carried out under the control of sight.

The cyst may be evacuated with the knife, as is customary in Germany, but this expeditious method always exposes to the danger of a greater or less degree of contamination of the wound, when the jet of liquid has lost its initial force; it therefore seems to me preferable to use the trocar.

It is sometimes necessary to puncture several cysts in succession; to do this, it may simply be necessary to push the trocar more deeply in, or in another direction, without withdrawing it. For the evacuation of very large cysts there is an advantage in using a large closed receptacle, the air of which has been previously partially exhausted.

If the tumour, microcystic and areolar, does not diminish in size after puncture there should be no hesitation in enlarging

the abdominal incision with scissors up to the umbilicus, all the layers being divided simultaneously; there is no real advantage, whatever may have been said to the contrary, in drawing the umbilical cicatrix to the left if the incision has to be taken beyond its level.

Stage III. Extraction of the cyst and ligature of the pedicle.—The trocar is removed by a sudden movement, while the assistant draws up the cyst-wall around the puncture; Nélaton's forceps are placed upon it to obliterate it and to facilitate traction. A second pair of the same or Museux's forceps are placed at a convenient point, and the surgeon begins, so to speak, to "deliver" the cyst by drawing it gently and aiding its removal by alternating side-to-side movements. In proportion as the tumour becomes freer, the assistant exerts pressure on the abdominal walls and apposes more and more the lips of the wound, so that at the moment when the cyst has been completely drawn out the wound is closed around the pedicle; in this way all extrusion of intestine is avoided. If, during extraction, the resistance of bands or of adhesions that had previously withstood the action of the hand has to be overcome, the mass of intestines must be raised by the hand of the assistant, covered by a warm compress sponge, and if necessary retractors may be placed between the lips of the wound so as to open it somewhat and allow of the division between two ligatures with the scissors, of the fibrous adhesions; they are only very rarely vascular.

The pedicle should now be tied, separated from the tumour, and returned to the abdomen.

This method of intra-peritoneal treatment of the pedicle was that adopted by the earlier operators; it was afterwards abandoned in favour of the extra-peritoneal treatment, which was usually employed until about 1880, when the intra-peritoneal method came into general use. It was in the year 1841 that Stilling* re-introduced the extra-peritoneal treatment in Germany; in England Duffin† brought it again into favour in 1850, but Spencer Wells‡ influenced most its general adoption.

* B. Stilling. *Holscher's Hanov. Annal.*, 1841, pp. 251 and 393.

† E. W. Duffin. *Trans. Roy. Med. Chir. Soc.*, 1850, vol. 34, p. 1.

‡ Spencer Wells. *History and progress of ovariectomy in Great Britain* (*ibid.*, 1863, vol. 46, p. 33).

Previous to this the pedicle had been simply stitched to the abdominal wound with sutures with needles. A new instrument, a kind of vice or clamp designed for the compression of the pedicle so as to secure hæmostasis and to keep it firm, was invented by Hutchinson in 1858, and was immediately adopted with an outburst of enthusiasm. Spencer Wells, Atlee, Wilde, Koeberlé, Hegar, and Kaltenbach invented various modifications in their turn. Clay and Baker-Brown invented a cautery-clamp for the combination of compression and cauterisation. In Paris surgeons generally contented themselves with crucial transfixion with long and strong needles, combined with constriction by means of Cintrat's *serre-nœud*.

The principal disadvantages of extra-peritoneal treatment of the pedicle are: mortification of the latter, which sometimes is rather extensive, and exposes to the danger of infection of the wound; and weakening of the abdominal cicatrix, which predisposes to the secondary occurrence of hernia. Nevertheless this procedure is worth keeping in those cases in which the surgeon has to treat either prolapse or pronounced retroflexion of the uterus along with an ovarian cyst; in point of fact, by the same operation one performs a gastro-hysteroplaxy.

It is quite exceptional for a pedicle to be so thin that it is sufficient to place a ligature around it and to tie it. It is always much better to transfix it and to tie either Lawson Tait's or Bantock's knot, which can be drawn very tight. If the size of the pedicle demand it, a chain-ligature may be applied. It is advisable, if the pedicle be short, to insert all the sutures before detaching the tumour, and only to divide the pedicle progressively, a centimetre at least above the threads, after having tied it in successive small segments. By these means retraction (very difficult to prevent at the bottom of the pelvis) of a prematurely completely divided pedicle will be avoided. If the pedicle be very thick, vascular, and but slightly differentiated from the rest of the tumour, it will be well to take a strong grasp upon it by the energetic compression of powerful adhesion forceps (fig. 45), or better still, of Billroth's forceps (fig. 44, 1). After a few seconds' application a depression or furrow will be formed, in which the ligature will hold much better, and in which hæmostasis will already have been more than half assured by the crushing of the tissues.

After detaching the tumour all the ligatures are cut 5 cm. above the knot. Before this, however, on the surface of the section, the lumen of large vessels is sought for, and they are separately tied with fine silk or catgut; the cut surface is brushed over with strong carbolic solution. If the pedicle be exceptionally fleshy and soft, or especially if the surface of the section seem to contain portions of suspected tissue, or finally, if the tube present signs of inflammation, the practice initiated by Clay and systematised by Baker-Brown should be adopted; it consists in searing the cut surface of the pedicle with the actual canterry. The neighbouring parts must be carefully protected by means of a damp compress sponge. Other authors* have advised, with the object of preventing the contraction of adhesions with the intestine and the production of internal strangulation, to stitch the two lips of the peritoneal wound over the pedicle; it seems to me that this is a useless complication, for false membranes very soon completely encapsule it.

The surgeon then examines the ovary on the opposite side, and if it appear in the least degree affected and the woman be close to the menopause, he removes it. If the woman be still young, and the lesion of the second ovary be very limited, the bold action of Schröder† may be followed. He, in a similar case, simply excised a small dermoid tumour, and united the edges of the wound in the ovary after having thus resected it. Shortly after the woman became pregnant, and was delivered normally. Schröder has resected the ovary in this way four times on young women. A. Martin‡ has since followed his example. The uterus must also be carefully examined, and if any fibrous nodules be found in it, and the woman be young, and the operation seem simple from the seat of the tumours, they may be enucleated. If the woman be near the climacteric, or myomectomy present difficulties, castration by removal of the second ovary is to be preferred.

Stage IV. Toilette of the peritoneum and closure of the abdomen.—When the operation has been simple, when there has been no effusion of irritating fluid, it is unnecessary to stop and

* Shultze. Bericht über die von 1884-85 und 1886 ausgeführten Laparotomien. (Corresp. des allg. ärztl. Vereins von Thüringen, 1887, No. 3.)

† Schröder. Gesell. f. Geb. u. Gyn. zu Berlin, July, 1884. (Zeitschr. f. Geb. u. Gyn., 1885, vol. 11, p. 360.)

‡ A. Martin. Samml. klin. Vorträge, 1889, No. 343.

sponge out any small quantity of blood that may be present in the pelvis. It will easily become absorbed,* and friction with compress sponges has always the disadvantage of removing the epithelium from the surface of the peritoneum, and of detaching some small clots that close the lamina of blood-vessels; fresh oozing of blood may result therefrom. But the practice of the surgeon should be diametrically opposite when cystic fluid, and particularly pus, has contaminated the field of operation. In the first case, the use of compress sponges is sufficient. One is wrapped round the finger and is inserted into all the lower portions of the abdomen. With regard to Douglas' pouch, the corner of a compress is seized with long curved forceps, round which the rest of the compress is rolled, and thus the serous fluid behind the uterus is soaked up. When pus or any very thick or irritating cystic material has escaped, the peritoneal cavity must be washed out. I have already given definite directions as to the conditions under which drainage and plugging are necessary.

The surgeon has now only to close the abdomen. I described at length (Vol. I.) how he should proceed, and I shall not return to the subject. My method of mixed suture† (continuous suture in two superposed layers for the peritoneum and aponeuroses, separate stitches for the integument) prevents the occurrence of herniæ and eventration, which is so common after suture *en masse*, as is the general custom.‡ If one find oneself in the presence of abdominal walls that bleed extensively on their internal surfaces, in consequence of the removal of large adhesions, and one fear capillary oozing after closure of the wound in the abdominal wall, over these excoriations of the serous membrane may be placed a series of sutures tied over

* Gluge and Thiernes as long ago as 1845 showed that blood could be injected into the abdominal cavity with impunity. Recently attempts at peritoneal transfusion have led to the repetition of these experiments upon man.—Edler. *Die traumatische Verletzungen des parench. Unterleibsorgane.* (Arch. f. klin. Chir., 1886, vol. 84, p. 198.)—Stephanesco (Considerations of the peritoneum, Thesis, Strasbourg, 1871) made injections of chemically pure air and of some colloid substances without evil results.

† I have used it since 1886 (see Bull. et. Mém. de la Soc. de Chir., Oct. 19, 1887, p. 577).

‡ Wertheimer. *Essay on herniæ secondary to laparotomy*, Thesis, Paris, 1887, No. 163.—W. Gill Wylie. *Ventral hernia caused by laparotomy* (Amer. Journ. of Obstet., Jan., 1887, vol. 20, p. 25).—E. Fasola. *Abdominal hernia consecutive to laparotomy* (Annal. di ost. e gyn., 1888, p. 198).

small rolls of iodoform gauze, and destined to appose the bleeding surfaces closely to one another; they should be left *in situ* two or three days.*

I have just described what may be called a typical operation, such as is performed for cysts. I must now return to two important operative conditions that may present themselves, and which relate, one to the absence of a pedicle, the other to the impossibility of fashioning it.

Enucleation of cysts enclosed within the broad ligament and retro-peritoneal cysts.—At the very outset I shall eliminate the consideration of the sub-peritoneal metastatic masses that are found either in Douglas' pouch or in the iliac fossæ along with pediculated tumours of one or both ovaries. To attack these microcystic and colloid masses that infiltrate the serous membrane rather than are enclosed beneath it is to court certain operative failure; it is rarely possible to extract them in their entirety, and the enormous excavations that one is obliged to make, combined with the traces of new growth left adherent, are sufficient to lead to infection. The surgeon ought therefore to content himself with removing the pediculated ovarian tumour, if this operation be simple, and leaving the secondary masses untouched, or even to close the abdomen, if the numerous adhesions that are almost always present in such cases lead him to foresee an operation at the same time difficult and incomplete.

A. *Hyaline parovarian cysts.*—These cysts with thin walls and limpid contents, springing from the very substance of the broad ligament, may have travelled thence beneath the serous membrane until they reach the meso-colon and the mesentery. They are very easy to separate from the serous membrane, which does not adhere to their surface unless there have been previous inflammation. When they have been recognised by their appearance, a fold of the peritoneum covering them must be cautiously taken up and incised, the finger introduced into the button-hole, and the serous membrane detached for a small area around. Into the portion of surface thus liberated the trocar is to be thrust and the liquid contents removed. After the trocar has been withdrawn, and the orifice has been obliterated by means of forceps, the peritoneum is stripped more extensively from off the surface of the cyst, which is then incised for a sufficient

* Von Hacker. Wien. med. Woch., 1885, No. 48, p. 1466.

extent, and by successive tractions, aided by the finger which breaks down the cellular connections, finally removed in its entirety. From time to time forceps are placed upon the bleeding vessels. The cavity left by the enucleation collapses of itself, without there being the slightest cause for anxiety concerning it.*

If the sac has become adherent in consequence of inflammation, often itself secondary to intra-cystic apoplexy, traces of which may be found in the colour of the fluid and brownish deposits on the wall, the operation is more difficult. I have twice found myself confronted with cases of this kind, and I could only complete the operation by resorting to the following procedure, which I recommend: free incision of the sac; fixation of the lips of the wound with a circle of forceps entrusted to an assistant; introduction of the left hand within the cyst so as to make out exactly its connections and to aid from within the attempts at decortication being carried on, without, by the right hand beneath the peritoneum. A very important rule is to proceed methodically, and in consequence not scatter one's efforts by abandoning the spot at which decortication has been commenced. Lastly, if possible, the ovary, which is usually healthy, should be respected.

B. *Capillary cysts of the broad ligament and enclosed glandular cysts.*—I combine these two varieties of cyst, in spite of their anatomical differences in other respects, because, from an operative standpoint, they present many great resemblances. I have already said that papillary cysts of the broad ligament,† although doubtless arising from the parovarium (be it from its intra-ligamentous portion, or from the portion that penetrates the hilum of the ovary) are not those which surgeons are accustomed to designate by the common name of parovarian cysts. This term is most generally applied to the parovarian

* The first clear indication of the decortication of cysts enclosed within the broad ligament was given by Miner (of Buffalo). Internat. Med. Congress, 1876, p. 801.— Cf. on the method L. Tait (Edin. Med. Journ., July, 1889, vol. 35, p. 20), who had operated on 102 cases with 1 death.

† William Goodell (Amer. Journ. of Obst., Jan., 1888, p. 1) in an interesting paper dealing with these cysts proposes to call them "intra-ligamentous cysts," and to reserve the name of "parovarian cysts" or "cysts of the broad ligament" for cysts containing limpid fluid. It seems to me that the only way of avoiding confusion is to consider the nature of the contents, and to speak of hyaline (parovarian) cysts and papillary cysts, further qualifying them as intra-ligamentous or of the broad ligament.

variety of hyaline cysts, which are, in point of fact, far the most common.

The sac-wall of papillary parovarian cysts is thick, often contains a layer of smooth muscular fibres which seem to bind it down to the uterus; their contents are clouded or milky, and they contain vegetating masses, like cauliflower in appearance. From the point of view of the thickness and vascularity of their walls they are therefore akin to glandular or papillary ovarian cysts. These cysts themselves, either because they originate from the hilum of the organ (papillary cysts), or because of some semi-heterotopic development, or of some congenital predisposition (glandular cysts) may separate the layers of the broad ligament in which they hide their base, instead of forming a pedicle. Close and intimate connections with the serous membrane, the uterus, the roof and sides of the pelvis, constitute further points of resemblance. The capital difference, from the point of view of anatomical relationships, is the independence of the ovary in the case of parovarian cysts, and its fusion with the tumour in the case of ovarian cysts. Capital from a purely anatomical standpoint, this difference is on the other hand of but slight importance from an operative standpoint.

For all cysts enclosed within the broad ligament, decortication is very difficult, by reason of the close adhesion of the peritoneum, which often can only be detached in strips; it is also laborious, by reason of the deeply-seated large blood-vessels; and, finally, it is dangerous on account of the immediate relation of the base of the sac with the ureter, and the possibility of tearing out or of wounding the duct.*

* A distinction must be drawn between the course of action to be adopted immediately one perceives that the ureter has been wounded, or later when the patient having survived the accidents that may arise, becomes the subject of a uretero-abdominal or a uretero-vaginal fistula. The latter case comes under the treatment of ureteric fistulae, and I will simply recall to the reader's mind that Simon was the first to perform nephrectomy in a case of this kind.

The course to be followed when the surgeon perceives, during the course of an operation, that he has wounded the ureter will be different according as the injury be a small laceration only, or as the duct has been completely torn out. In the first case the best plan is to stitch up the wound in the duct as perfectly as possible, and to place within it a gum retention-catheter by first catheterising through the bladder (Pawlik's or Simon's method, *q.v.*), and then guiding the catheter through the abdominal wound. I believe it would also be wise in such a case to pack the peritoneal cavity with antiseptic tampons above the wounded part, for the edges of the wound might not unite, and an exit must be given to the urine, while at the same time the surgeon would rely on the formation of protective adhesions which may then

It is better to empty the sac at the outset. The prominent portion is then seized with Nélaton's forceps (fig. 149, B), brought out of the abdominal wound, and a large ellipse is drawn upon it with the knife which encloses the whole of that portion of the sac that can be drawn out from the abdomen. The incision, if possible, only comprises the peritoneum, which then is stripped off with the assistance of forceps, a spatula, and the finger, so as to dissect off a deeper and deeper circular collar, concentric with the cyst against which one is working. It is better to begin this decortication at the most vascular spots, and to tie at the outset the large vascular trunks from which the secondary branches spring. It will often be necessary, so as to keep one's true position in mind, to place a sound in the uterine cavity and confide it to the care of an assistant, for the uterus is sometimes so much displaced or hidden by the tumour that it can only be found with great difficulty. For the breaking down of uterine adhesions, this organ must be drawn out of the abdomen as much as possible, and supported upon a bed of compress sponges. There are some cases in which one

still further limit the area of extravasation. Schopf (Allg. Wien. med. Zeit., 1886, No. 31) in a case of ovariectomy for an intra-ligamentous cyst in which the ureter had been wounded, first of all temporarily placed forceps on the two cut ends, then united them by eight silk stitches, without including the mucous membrane; he had a temporary recovery lasting four weeks, but then accidents supervened, and carried off the patient in less than two months. At the autopsy lardaceous degeneration of the kidneys and plastic peritonitis were revealed. In another case the same surgeon preferred to unite the divided ureter on an English gum-elastic catheter, which passed through the urethra, not filling it completely so as not to obstruct the passage of the urine secreted by the other kidney.—A. Gusserow (Charité Annal., 1887, vol. 12, p. 680) ligatured the ureter under the following circumstances:—During the enucleation of a malignant intra-ligamentous cyst, a small strip of the tumour which could not be removed had been ligatured at the bottom of the wound; the ureter had been included in the ligature, for on the ninth day there supervened a large abscess with septic peritonitis, and the patient succumbed on the fifteenth. On a similar occasion Gusserow would recommend opening the abscess through the posterior vaginal cul-de-sac, with the object of producing a uretero-vaginal fistula. I should prefer in such a case to plug the peritoneum with antiseptic tampons as a preventative.

In a case of enucleation of a retro-peritoneal parovarian cyst, I tore out the right ureter, which was adherent to the cyst, and which ruptured about 10 cm. below the brim of the pelvis; the rest of the ureter was completely detached and hung out of the belly. Instead of attempting suture, which would assuredly have failed, I took the step of forming a ureteric fistula in the right lumbar region, and then resected the vesical end of the ureter after having tied it and stitched it in the wound. Some time later I performed nephrectomy. At the present time the patient is in perfect health. S. Pozzi. Wounds of the ureter during laparotomy (French Congress of Surgery, 5th meeting, Paris, 1891, p. 606).

will be obliged to perform hysterectomy, so as to simplify and terminate rapidly an operation that has already been a long one.

Definitive hæmostasis will be obtained either by means of ligatures or by means of overcasting catgut sutures, that must be placed very superficially over the whole of the bleeding surface, so as to avoid wounding any of the deeper vessels. Temporary compression with compress sponges, or touching with the thermo-cautery, may be sufficient to overcome persistent capillary oozing. If these means do not succeed, I should prefer plugging the peritoneum with iodoform gauze to the use of definitive forcipressure with collection of the forceps at the inferior angle of the wound.

When the operation has been completed, the extent of the intra-abdominal wound must be diminished as much as possible by drawing the strips of peritoneum together with catgut. Loose fragments should be excised. If a cavity remain too deep to be easily covered by overcasting the broad ligament, attention must be directed chiefly to the burrow thus formed, and to its separation from the abdominal cavity itself. According to circumstances, the surgeon will choose suture of the edges of the cavity to the abdominal wound with iodoform gauze plugging, or the introduction of a tube with cross-piece through the bottom of the wound into the posterior vaginal cul-de-sac, and then careful suture of the cavity on the peritoneal surface (Martin). This tube will be more easily introduced through the vagina from below upwards by following the rules I have already given.

Incomplete operations; marsupialisation of the cyst.—When the firmness of the adhesions to the sides of the pelvis, or to the layers of the broad ligament, renders the formation of a pedicle or enucleation impossible, there still remains one resource for the surgeon. It consists in fixing the edges of the sac, of which the hinder end could not be detached, to the edges of the abdominal wound, and in plugging or draining the cyst as if it were an abscess cavity, leaving to Nature the care of obliterating or of eliminating it. Before proceeding to fix the sac to the abdominal wall, the surgeon must stitch up all the upper portion of the wound, and leave open only a sufficient extent of its lower angle to serve his purpose. The opened sac is kept raised above the belly by an assistant. With forceps, if necessary, one or

two large folds are formed in it, the permanency of which is secured by a few stitches. Then the circumference of the sac, drawn moderately on the stretch, is firmly stitched around by a circular series of strong silk sutures which traverse the whole thickness of the sac-wall and the whole thickness of the abdominal wall at a distance of 2 cm. from the edges of the wound. Every stitch must be immediately tangential to its neighbour. A second series of superficial stitches, uniting the skin alone to the sac, is afterwards put in. The interior of the cyst is carefully cleansed, all vegetations and all the mucous lining are removed, it is washed out with sublimate, and then a large drainage-tube, pierced only with three holes at its lower part, is placed in it, and finally the sac is lightly packed with iodoform gauze.

This procedure, recommended on its broad lines by Clay, Spencer Wells, Péan,* and adopted later by all other operators, is evidently nothing more than a last resource. It may yield excellent results with unilocular cysts having thin walls, such as hyaline parovarian cysts when they have become adherent through inflammation. But in such cases there is rarely need to apply it. It is almost always in the case of proliferating cysts that it has to be resorted to. Then, particularly when the cyst-wall presents papillary vegetations, the results are very moderate. The tumour tends incessantly to recur, the abdominal fistula persists for an indefinite length of time, and the interminable suppuration exposes the patient to the dangers of chronic septicæmia and exhaustion.† Malignant degeneration has been known to occur around the wound. The chance of success may be considerably increased by taking care to remove from the interior of the sac, as far as possible, all the glandular elements that it contains by means of the finger or a blunt curette. Rheinstädter,‡ who lays great stress upon this point, has obtained thus seven durable recoveries, four of which date from more than two years previous. In the happiest cases, the whole of the sac dies and is eliminated.

* Péan. *Union méd.*, Dec., 1869, p. 874 and foll., and *Gaz. des Hôp.*, Nov. 25, 1871, p. 553.—Urduy. On some difficulties during ovariectomy and hysterectomy. Thesis, Paris, 1874.

† F. Terrier. Results furnished by the incomplete removal of cysts of the ovary (*Rev. de chir.*, 1881, vol. 1, p. 625).

‡ A. Rheinstädter. Sieben Ovariectomien mit Einnähhung der Tumorbasis an die Bauchwunde; Heilung ohne Recidiv (*Zeitschr. f. Geb. und Gyn.*, 1884, vol. 10, p. 257).

This procedure, which forms a sac in front of the pubes, somewhat similar to that present in kangaroos, has received for this reason from some American writers the expressive name of "marsupialisation."

Ovariectomy should always be carried out as quickly as possible in simple cases uncomplicated by any important adhesions; the average time occupied by the operation, including suture of the abdominal walls, as I have myself made out, need not exceed twenty minutes. Every peritoneal operation that lasts for more than an hour acquires from that fact alone a special degree of danger. The operation will be the less serious if certain precautions are taken. The assistant must always keep the abdominal wound open to the minimum extent, must never leave the intestine or the omentum exposed, but must cover it with moist and warm compresses. The surgeon must work as far as possible outside the abdominal cavity, and must constantly cleanse his hands by plunging them into the sublimate solution, 1 in 5,000, kept in a basin by his side. Evisceration, or temporary extraction of the mass of the intestines, which are placed on the abdominal walls and enveloped in warm compresses, certainly gives plenty of room to the operator, but should only be an exceptional procedure. It may be avoided by having the intestines firmly pressed back by the hand of an assistant placed within the abdominal cavity and covered with a compress sponge. The patient's pelvis may also be raised by an assistant, who places her knees on his shoulders and his back towards herself. The operator must then change his position and stand at the side.

The dressing is most simple. The wound being, in point of fact, exactly apposed; if the operation has been aseptic, one might say that, theoretically, there should be no need of any local dressing, but that immobility and compression would be sufficient. I have had some very good results with simple cotton wool. Nevertheless it is always better to guard against possible infection, and to use antiseptics for everything which is not within the peritoneal cavity. I am accustomed to wash the surface of the belly with sublimate, to powder a small quantity of iodoform over the line of stitches, to apply a layer of iodoform gauze cut into strips and crumpled, above that a layer of absorbent cotton wool, and then an elastic pad made of

moss, enclosed in a gauze bag, and finally a flannel bandage encircling the body. Too much cotton wool must not be heaped on, nor should too great pressure be applied, as was done by the earliest operators.

After-treatment. Accidents.—The patient must have the catheter passed every three hours during the first two days at least, and more if necessary. She is laid on a bed previously warmed, her thighs slightly raised by a cushion placed beneath the knees. If the patient is very weak and in a fainting condition, an attempt must be made to rouse her by subcutaneous injection of ether, and she must be kept enveloped in warm blankets.

One is sometimes warned of internal hæmorrhage, shortly after the operation, by a feeling of sudden agony, fainting, shivering, cold sweats, rapidity of the pulse; the face grows pale; the extremities become cold; and when a drainage tube has been inserted in addition, blood is seen to exude from it. In a case of this kind, Hofmeier, suspecting this accident in a patient who had been operated upon by Schröder, ventured to loosen two stitches eight hours after the ovariectomy, found the abdomen full of clot, and the ligature slipped off the pedicle. He saved the patient. There must be no hesitation in following this example. During the first day no food must be given the patient, but only a little ice, a little cold brandy and water, or some still champagne. Great care must be taken not to give these liquids in any quantity, for one of the best safeguards against vomiting is to keep the stomach empty. Vomiting due to the chloroform has, under these conditions, no prognostic value. On the second day, a little milk, with equal parts of eau-de-Vals, may be added to the food. Some surgeons administer opium to soothe the pain and procure sleep. It is a deplorable practice, for its chief effect is to paralyse the bowel.

On the third day, if the vomiting continue or re-appear, and have a greenish colour, if the belly become painful and distended, the pulse frequent, even though the temperature be not raised, the development of septic peritonitis is almost certain. For its diagnosis it must be remembered that consideration of the pulse is of infinitely greater value than that of the temperature-chart. Surgical inflammations of the peritoneum are

even sometimes accompanied by a subnormal temperature. When a fatal event will occur, the vomiting becomes, at any rate at the commencement, incessant and almost continuous, and the patient dies without great suffering and with a little quiet delirium. Olshausen,* long ago, clearly pointed out the septic nature of these symptoms. The peritonitis is rather dependent upon the septicaemia than the converse. At the autopsy one only finds enormous distension of the intestines, and a small quantity of cloudy serum in the true pelvis. Olshausen† attributes much importance to paralysis of the intestine and absorption of the toxic substances contained within it. Verchère‡ has developed this theory, as also has Sänger.§ Care must be taken not to mistake this collection of symptoms as being dependent upon ileus, though sometimes it is very difficult to distinguish the two. No doubt it depends rather upon a true toxæmia from absorption of leucomaines and ptomaines, arising either from the liquids effused into the abdominal cavity, or from the gas and faecal matters imprisoned in the paralysed bowel. With regard to the initial starting-point of the septic peritonitis, cessation of the intestinal movements due to exposure to the air has been accused, whether it acts directly upon the muscular fibres, or indirectly upon the nervous plexuses in their coats.

Be that as it may, one of the best signs of commencing peritonitis is intestinal paralysis, which shows itself not only by tympanites, but also by cessation in the passage of flatus. This intestinal paralysis, which is then an effect, may sometimes be a cause of inflammation of the peritoneum. It is, therefore, necessary to treat it at the very commencement. I am accustomed, on the evening of the second day, to order an enema composed of six table-spoonfuls of claret and three table-spoonfuls of glycerine, with the object of inducing slight intestinal contractions. If this enema remains without effect upon the passage of flatus, I repeat it the next morning, with the addition of one or two spoonfuls of syrup of senna, and I

* Olshausen. *Die Krankh. der Ovarien*, p. 356.

† Olshausen. *Centr. f. Gyn.*, 1888, No. 1, p. 10.

‡ F. Verchère. Report of the third French Congress of Surgery, March, 1888, p. 291.

§ Sänger. *Leipzig Gyn. Soc.*, Feb. 20, 1888 (*Centr. f. Gyn.*, June 30, 1888, No. 26, p. 436).

introduce through the anus a gum catheter, No. 20, which must be passed up for a distance of 10 cm. to allow of the exit of gas in spite of the tonic contraction of the sphincter. I think this course preferable to the administration by the mouth of purgatives, which are vomited up as often as not.*

After the fourth day, if everything be satisfactory, the patient may take some solid food. On the eighth day the silk stitches are removed, and it is scarcely necessary to replace them by a dry stitch, on account of the still persisting action of the hidden suture. Union has then become complete as a rule, except over some few folds where the parts may ride up a little. The dressing is now changed for the first time, and a similar one is readjusted, after having washed the belly with sublimate. On the fifteenth day the patient may be sat up in an arm-chair, and walk about a little for the first time a week later.

After removal of the stitches, under the strain of an attack of coughing or of vomiting, secondary disunion of the wound and hernial protrusion of the intestine has been known to occur; many cases have been published in which this accident has been followed by no serious results, when the viscera have been cleansed and replaced even after the lapse of some hours. I myself have seen such a case in one of my patients, where the hernia of the gut took place at the opening left for a drainage tube; she recovered perfectly.

A very rare accident is the production of emphysema of the abdominal walls, caused by attempts at vomiting; it is not serious, but predisposes to the occurrence of suppuration.†

Superficial abscesses may be formed about the stitches when antiseptics has not been complete, or when the wound has been infected secondarily by reason of deep drainage of a focus of suppuration. As soon as the surgeon is warned of its onset by local induration and pain, he must hasten and gently open up

* This practice of inducing intestinal action very hastily after laparotomy is very general. Hegar and Kaltenbach, *loc. cit.*, Hofmeier, *loc. cit.*, Lubarsch, *Inaug. Dissert.*, Strasburg, 1884.—Wylie. *Med. Record*, New York, March 19, 1887, vol. 81, p. 818.—P. Mundé. *Amer. Journ. of Obstet.*, 1888, vol. 21, p. 136. Most French surgeons follow the same practice.

† Winter (Berlin Obst. and Gyn. Soc., May 10, 1889, in *Centr. f. Gyn.*, 1889, No. 24, p. 418) has seen two cases of this, in one of which suppuration occurred beneath the very notice of the operator, and resolved; the other ended in the formation of an abscess.

the wound with a director, wash it out with strong carbolic and introduce into it two small drainage tubes.

Deep abscesses about the pedicle or the sutures left within the abdomen* are more difficult of recognition. If the rise of temperature and deep infiltration over a limited area, made out by bimanual palpation, allow of sufficient certainty in diagnosis, no hesitation should be felt in re-opening the abdomen so as to evacuate the pus and clean out the seat of suppuration; a drainage tube, under these circumstances, ought always to be inserted.

Parotitis† has also been known to occur during convalescence, but it is not at all common; it is always an indication of a certain degree of septicaemia, and the prognosis is not favourable.

Peritonitis, which may be manifested as a sub-acute variety at the first, may also not supervene until from the tenth to the fifteenth day, and then, no doubt, arises from septic mortification of the pedicle, or of the other masses that may have been ligatured and left in the abdomen. I have seen one case, the starting-point of which was in numerous portions of omentum that had been ligatured with bad catgut. It is more insidious than peritonitis from the first, and rather assumes the form of a peritoneal septicaemia. Rise in temperature is not common; tympanites and vomiting, at first bilious, and later faecal,‡ also make their appearance.

Treatment is almost powerless to arrest peritonitis. Directly its onset is ascertained, cold should be applied to the abdomen by means of an ice-bag, or more conveniently, by means of a Galante's refrigeration plate, through which a current of ice-cold water is kept up. Small pieces of ice should be given by the mouth, and will render the retching less painful. I think that effervescing drinks, such as Rivière's drink, do more harm than good. With regard to hypodermic injection of morphia, I only allow it to be given when I consider the case to be hopeless.

* J. Boeckel (Strasburg Med. Gaz., 1881, p. 75) reports two striking cases of accidents arising from non-absorption (and probably also from insufficient disinfection) of the catgut; one case of peritonitis, one of deep abscess which recovered.

† † Matwef. Ann. de Gyn., 1885, p. 405.—E. Bumm (Ueber Parotitis nach Ovariectomy, in Münchn. med. Woch., 1887, No. 10, p. 173) was only able to collect 17 published cases.

‡ Levrat. Peritoneal septicaemia after ovariectomy. Thesis, Paris, 1880.

Re-opening the abdomen in these cases has never been of any use. Schröder, Hofmeier, Hegar, and Kaltenbach are unanimous in condemning it. I have, on one occasion, tried it myself without success; but our experience on this point does not seem to me to be definitive.

Amongst the rarer complications, I must mention intestinal obstruction,* which has been attributed to the formation of adhesions about ligatures or divided surfaces; it may even be favoured by destruction of the peritoneal epithelium, caused by using sponges or compresses steeped in too strong antiseptic fluids; hence the rule of washing them in boiled water before using them, and generally of being aseptic only and not antiseptic in the peritoneal cavity.

Out of 1,000 ovariectomies, Spencer Wells seems to have had 11 deaths from intestinal obstruction. For the treatment of this accident, Leopold† recommends the use of forcible enemata of warm chamomile decoction with the addition of oil and soap; several litres should thus be given, after which the patient should be laid on her side. These means, to which Leopold believes he owes some of his best successes, may be tried, but too much time must not be spent before re-opening the abdomen and going in search of the obstacle, which is generally an adhesion to the pedicle or to the abdominal wound.‡ Bearing this last possibility in mind, the surgeon must proceed very cautiously.

Other exceptional causes of death are tetanus,§ phlebitis, and embolism.

Uræmia, acute or chronic, has also been observed, due to congestion of kidneys already diseased, induced by the prolonged anæsthesia and the operation.

Shock is a vague expression, which embraces accidents of the most varied nature, from unrecognised embolism and fulminating

* Nieberding. Gyn. Congr. at Halle (Centr. f. Gyn., 1888, No. 26, p. 425).—W. Hirsch. Ueber Darmocclusion nach Ovariectomie (Arch. f. Gyn., 1888, vol. 32, part 2, p. 247).—Salin. Centr. f. Gyn., 1889, p. 822.—Tuttle. Trans. Obst. Soc., New York (Amer. Journ. of Obst., 1889, p. 952).—Obalinski. Berl. klin. Woch., 1889, No. 12, p. 251.

† Leopold. Gyn. Soc. of Dresden, Jan. 3, 1889 (Centr. f. Gyn., 1889, No. 16, p. 283).

‡ W. Hirsch. *Loc. cit.*

§ Thiriar. Four cases of tetanus following upon ovariectomy (Compt. rend. du Congr. franç. de Chir., Paris, 1886, p. 97).—Johnson (Journ. Amer. Med. Assoc., July 13, 1889, p. 63) has collected 15 cases of it.—Richelot. Bull. et Mém. Soc. de Chir., 1888, p. 696.—Phillips, Doran, Humphry. Med. Chir. Soc., Lond., Jan. 12, 1892.

uræmia to cardiac failure on account of enfeebled nutrition of the organism.*

Statistics of the operation.—It is almost impossible to arrive at the rational prognosis of ovariectomy, as is the case with all other major operations, without drawing a line between simple and complicated cases. Unfortunately this classification does not exist in the statistics, and, in point of fact, it would be very difficult to draw the line. Be that as it may, according to the latest information it seems that removal of a cyst, when there are no extensive adhesions, is at the present day a very harmless operation. Another important lacuna in the majority of statistics is the absence of sufficient information concerning the cause of death. Nevertheless there is no doubt that the great majority of deaths is from septic peritonitis. It is almost always the malignant tumours with extensive adhesions that cast a shadow over the statistics. Moreover, some surgeons have not hesitated to operate only upon favourable cases. The following series have been taken from Olshausen†:—

Spencer Wells	1,000 cases with 768 recoveries
Keith	381 " 340 "
Koeberlé	306 " 231 "
Thornton	423 " 383 "
L. Tait	405 " 372 "
Olshausen	293 " 266 "
Schröder	658 " 575 "

It would be interesting to break up each series to appreciate the diminution in the mortality, as each surgeon perfects his method. Hofmeier‡ has done this with the cases of his master Schröder. It is as follows:—

From 1 to 100	17 deaths
" 100 " 200	18 "
" 200 " 300	7 "
" 300 " 400	16 "
" 400 " 500	7 "
" 500 " 600	7 "
" 600 " 658	11 "
658	83 deaths, or 12·6 per cent.

* M. Hofmeier. *Zur Lehre vom Shock* (Zeitschr. f. Geb. u. Gyn., 1886, vol. 11, p. 366).

† Olshausen. *Loc. cit.*

‡ Hofmeier. *Loc. cit.*, p. 311.

Hofmeier expressly states that amongst these deaths an infinite minority was due to infection, and that nearly all of them must be attributed to serious accidents following on the removal of malignant tumours. This explains, for example, the high percentage of 11 deaths in the last 58 operations. In the 5th and the 6th hundreds he had series of twenty and of forty successive recoveries.

Lawson Tait,* who had only 9·2 per cent. of deaths in his first series of a thousand laparotomies, and in his second similar series only 5·3 per cent., has given the following numbers for his last ovariectomies: parovarian cysts, 1 death out of 24; ovarian cysts, on one side only 6 deaths out of 158 cases; on both sides, 2 deaths out of 78 cases; cysts enclosed between the layers of the broad ligament, 12 cases without a single death.

Ch. Braun,† in his second series of 100 ovariectomies, representing his operations from 1884 to 1887, had 13 deaths, but in this number there do not figure 7 deaths, said as occurring after exploratory incision. From 1889 to 1890 he had two deaths out of 52 ovariectomies, or 3·8 per cent. Freund,‡ out of 191 operations, had 17 deaths.

G. Granville Bantock,§ in his fourth series of a hundred ovariectomies, performed with simple aseptic precautions, had only 4 deaths, while he had 19 in his first hundred performed by the Listerian method. Dohrn, out of 100 ovariectomies performed from May, 1883, to April, 1889, lost only 4 patients.

Terrier¶ has published 200 ovariectomies, performed from July, 1874, to July, 1889; he had 37 deaths or 18·5 per cent.

* L. Tait. Second series of a thousand consecutive cases of laparotomy (anal. in *Bull. méd.*, 1888, No. 89, p. 1459).

† C. Braun von Fernwald. Ueber ein zweites Hundert Ovariectomien (*Wien. klin. Woch.*, 1888, vol. 1, p. 4—7, and *Wien. med. Blätter*, 1888, vol. 11, No. 19, p. 589).—Egon Braun v. Fernwald. *Beitr. zur Lehre der Laparotomien, &c.*, Vienna, 1890, p. 14 and foll.

‡ Freund. *Centr. f. Gyn.*, 1890, No. 36, p. 646.

§ G. Granville Bantock. *Brit. Gyn. Journ.*, 1889, vol. 5, p. 343.

|| Dohrn. 100 Ovariectomien aus der Königsberger Frauenklinik (*Centr. f. Gyn.*, 1890, No. 9, p. 137).

¶ F. Terrier. *Rev. de chir.*, vol. 2, p. 349; vol. 4, p. 1; vol. 5, p. 12; vol. 6, p. 985; vol. 7, p. 677; vol. 8, p. 965; vol. 9, p. 304; vol. 11, p. 588.—These results are divided into series of 25 ovariectomies: 1st series, 1874-1880, 3 deaths; 2nd, 1880-2, 9 deaths; 3rd, 1882-4, 2 deaths; 4th, 1884-5, 5 deaths; 5th, 1885, 6 deaths; 6th, 1885-6, 4 deaths; 7th, 1886-8, 5 deaths; 8th, 1888-9, 3 deaths.

Terrillon,* out of 278 ovariectomies, forming his total from September, 1880 to 1892, has had 24 deaths or 8·6 per cent.

Results of the operation.—When the tumour was benign, the patient, after operation, is definitely cured; she is merely predisposed to hernia from relaxation of the cicatrix, if the wound has not been stitched up with the peculiar care that I have indicated. Even then it is wise to tell the patients to wear a slightly supporting abdominal belt; but there is no need for it to be padded or of any special kind, as is necessary when the cicatrix, owing to the insertion of only one row of stitches, is insufficiently strong.

A cyst of the other ovary, or broad ligament, may later be formed, and oblige the surgeon to re-open the abdomen.† When he is called upon to perform one of these second operations, he must always remember that the bowel has a tendency to adhere to the first cicatrix. It is, therefore, well to begin the fresh incision at a short distance above the upper termination of the old one, and to guide his knife upon the finger introduced through this button-hole when dividing the cicatrix from top to bottom. From the observance of this precaution, I avoided wounding the intestine, which was extensively adherent in a case in which I performed a second laparotomy a year after the first. The case was one of a hyaline parovarian cyst, which had developed on the right side, after a similar tumour had been removed from the left. On the other hand, I know of a case in which the small intestine was immediately divided beneath an old cicatrix by a surgeon who was nevertheless very experienced, in one of these repeated laparotomies. The patient rapidly succumbed.

I have already considered, when dealing with prognosis, the question of the recurrence and the generalisation of malignant tumours. I repeat that it is generally localised in the peritoneum, only exceptionally invades the abdominal viscera and walls, more rarely still the mammae, the lung, and the medi-

* O. Terrillon. Written communication, Jan., 1892.—The series are of 35 cases, except the first, which contains 33. 1st series, 1880-4, 4 deaths (out of 33); 2nd, 1884-86, 6 deaths (out of 35); 3rd, 1886-7, 4 deaths; 4th, 1887-8, 3 deaths; 5th, 1888-9, 1 death; 6th, 1889-90, 2 deaths; 7th, 1890-1, 3 deaths; 8th, 1891-92, 1 death.

† A. Martin. Ueber die an derselben Person wiederholte Laparotomie (Zeitschr. f. Geb. u. Gyn., 1888, vol. 15, p. 239). He reports four cases of his own.

astinal glands.* Second has even found epithelial degeneration of the axillary glands. The secondary tumours may be of the epithelial, of the sarcomatous, or of a mixed type (Poupinel). Their evolution is rapid and leads to death in the same way as the cancers.

Is it possible to see in the smallness of the pedicle a guarantee of the benign nature of the cyst, as Terrillon† believes? This consideration is purely theoretical.

Grafting of cancer, seen by Nicaise,‡ as the result of puncture of a malignant ovarian cyst, seems to me to be simply a mistake in interpretation. He saw a nodule formed around the small cicatrix, and attributed it to the engrafting of some cancerous cells, carried by the trocar. It is much simpler to explain it by the development of a neoplastic metastasis at a spot of diminished resistance.

Menstruation and fertility after operation.—Women who have had unilateral ovariectomy performed continue to menstruate as before, and are susceptible of impregnation. A bilateral operation produces a premature menopause whenever the two ovaries have been completely and effectively extirpated,§ but its onset may be delayed for several months. The cases of intentional resection of a part of the ovary only, when the other organ has been completely removed, in which pregnancy has occurred (Schröder), as well as the numerous cases of persistent menstruation after so-called double ovariectomies that were evidently incomplete, show that only a very small portion of ovarian tissue is necessary to maintain the instigating reflex of menstruation. Now, it is very difficult when one is removing an ovarian tumour with a short pedicle, and particularly if the tumour be papillary, to be certain that none of the organ has been left. I have, however, discussed this question in detail in the chapter on Amenorrhœa.

Insanity after operation.—After ovariectomy, even more than

* Poupinel. Multilocular cystic epithelioma growing from the left ovary; ovariectomy; recovery. Epithelioma of the left mamma recurring twice after complete removal; generalisation of the cancer to the peritoneum, and probably also to the pleura; death (Annal. de Gyn., Jan., 1890, p. 85).

† Terrillon. Bull. et Mém. de la Soc. de chir., 1885, p. 269.

‡ M. Nicaise. Rev. de Chir., 1888, p. 806.

§ Ormières. Thesis, Paris, 1880.—Terrier. Rev. de Chir., 1885, p. 953.—Anvard. Gaz. hebdomadaire, 1887, p. 274.—Olshausen. Loc. cit., p. 377.

after any other operation upon the female generative organs, cerebral disorders of the form of acute mania, or of dementia, have been observed to appear. Insanity is particularly likely to occur in subjects having strong hereditary tendencies. But it may also, in some very exceptional cases, appear without there being any known cause. In such cases the greatest care must be taken to exclude the abuse of alcohol, and to consider whether the cerebral symptoms may not be caused by absorption of iodoform. The mental disorder may often be only transitory, as in a remarkable case that I have seen; but it may be permanent.*

Similar results have been observed in a fairly large number of cases after abdominal hysterectomy,† and even after operations upon the vulva, perineum, the cervix, or the breast.‡ In these latter cases it is very difficult not to believe that the operations were performed on neuropathic subjects, in whom almost any circumstance would have sooner or later provoked a catastrophe that was always imminent. Be that as it may, it has been demonstrated by several well-considered cases that the surgeon has always to bear in mind the possibility of this complication, however rare it may be, and even to take it into account when formulating the prognosis of ovariectomy in the case of a patient presenting a predisposition to insanity, or simply hereditary nervous antecedents.

Cysts complicated by pregnancy. Ovariectomy during pregnancy.—Occasionally pregnancy has been known to proceed

* L. Montfort. Arch. de tocol., Aug. 15, 1886, p. 673.—On the other hand ovariectomy performed on an insane person has been known to improve her mental condition, Terrillon. Ann. de Gyn., 1887, p. 204.

† Lossen and Fürstner. Berl. klin. Woch., 1880, No. 34, p. 481.—F. Kaarsberg. Nord. Med. Arch., 1884, vol. 19, part 4 (Anal. in Centr. f. Gyn., 1888, p. 692).—Th. Keith. B.M.J., Dec. 10, 1887.

‡ Barwell. Intern. Med. Congr. at London, 1884.—Gnauck (Berlin Gyn. Soc., May 27, 1887; in Centr. f. Gyn., 1887, No. 26, p. 418) cites a case of hypochondriasis, consecutive to a second operation of perineorrhaphy.—E. Ill. Pitts. Med. Journ., Jan., 16, 1888.—Grace Pecham. Med. Rec., Feb. 18, 1888, vol. 33, p. 177.—Werth. Ueber Entstehung von Psychosen in Gefolge von Operationen im weibl. Genitalapparate (Verhandl. der deutsch. Gesells. f. Gyn. 2nd Congress, Halle, 1888, p. 60 and foll.). Vide the discussion.—Gaillard Thomas (New York Med. Journ., May 25, 1889, vol. 49, p. 580) has cited 6 cases of post-operative insanity, of which 2 were fatal; in 4 women there were hereditary antecedents: 2 after ovariectomy; 1 after perineorrhaphy; 1 after Emmet's operation; 2 after amputation of the breast.—Some published cases seem open to question, e.g., Kreutzmann, of San Francisco (New York Med. Monatschr. Feb., 1889, vol. 1, No. 2, p. 87); it seems as if the case was one of uræmia consequent on the ovariectomy.

and deliverance to be effected without any intervention of the surgeon; but such cases are exceptional. The rule is, that small intra-pelvic cysts, if they allow pregnancy to proceed, lead to formidable complications when labour comes on. Large abdominal cysts are almost a certain cause of abortion, and are very likely to become twisted at the pedicle, to rupture, or to suppurate, thus leading to peritonitis. If the certain dangers of the expectant treatment be weighed against the benignity of ovariectomy undertaken sufficiently early, there can be no room for hesitation.* But this is not accepted without opposition. Some authorities prefer to induce abortion,† or premature labour, or even to simply puncture the tumour.‡ In the first two cases the obstacle to contraction of the uterus is an eventual cause of hæmorrhage, or of puerperal troubles, and in the last case there is the chance of wounding the uterus, and generally abortion has occurred under disastrous conditions.

The question assumes a different appearance according as one is called to the patient before or during labour.

In the absence of labour I do not think the surgeon ought to hesitate about performing ovariectomy. In point of fact, according to the statistics reported by Rémy,§ it was found that out of 67 ovariectomies performed during pregnancy, there occurred 13 times interruption of gestation and death of the woman, 22 times abortion and recovery, 32 times delivery at term and recovery; in other words, 19·4 per cent. of the mothers died, and 52 per cent. of the children. But these results have been much improved upon since their publication. Out of 36 cases operated upon by Lawson Tait, Spencer Wells, and Schröder, there was only one death. In the immense majority of cases, the life of the fœtus is also preserved and pregnancy continues.

Olshausen mentions 7 cases in which the gravid uterus was mistaken for a cyst and punctured. The greater number of the

* Reuter. *Ovariectomie bei Gravidität*. Inaug. Dissert., Jena, 1888.

† Barnes. *Clinical Treatise on Dis. of Women*, French trans., 1876, p. 841.

‡ Stoltz, according to Doumaïron. Thesis, Strasburg, 1868.—Treille. *Ovarian tumours in relation to midwifery*. Thesis, Paris, 1873.—Boinet and Ferrand. *Art. Ovary*, *Encycl. Dic.*, 2nd series, vol. 19, p. 220.—Polaillon, *Bull. et Mém. Soc. chir.*, Aug., 1885, p. 607.

§ S. Rémy. *Pregnancy complicated by ovarian cyst*. Thesis, Paris, 1886.

operators then immediately performed Cæsarian section, and 5 of the patients recovered.*

The operation is infinitely less serious before the fifth month of pregnancy than later. According to Schröder,† that depends upon the fact that there is no delaying of the retraction of the pedicle from separation of the layers of the broad ligaments. Be that as it may, out of 21 cases operated upon before this period 1 only was followed by death.‡

It is only if the surgeon were to find himself face to face with a cyst manifestly beyond operation that he would confine himself to tapping it.

During labour recourse has been had by turns to forceps, version, craniotomy, and even the Cæsarian operation.§

Before anything else, an endeavour must be made to press back the tumour above the promontory of the sacrum, by means of the fingers introduced into the rectum, while the woman is placed in the genu-pectoral position. If one could not succeed, the tumour should be tapped through the posterior vaginal cul-de-sac (Lomer). If the contents are too viscid to be thus evacuated, it has been advised to make a large incision at this spot, so as to remove the cyst (usually dermoid) which could not be reduced in size. With regard to the use of forceps, they are very likely to lead to laceration; version is rarely possible. Practically, the only choice lies between craniotomy if the fœtus be dead, and Cæsarian section if it be living.

Personally, I should not hesitate about performing laparotomy to discover whether the cyst is capable of removal. Ovariectomy would then remove all difficulties, and there would be no further difficulty in the way of parturition. If it be impossible, Cæsarian section, or Porro's operation, do not seem to me to

* Olshausen. *Loc. cit.*, p. 129.

† Schröder. *Dis. of the female gener. organs.* French trans., 1886, p. 434.

‡ Terrillon and Valat (on the course to be adopted in the presence of pregnancy complicated by an ovarian cyst, in *Arch. de tocol.*, April, 1888, p. 207) report 3 cases followed by recovery; abortion occurred in one of them in which the operation had been performed at the end of the second month. — O. Engström (*Ueber Ovariectomie während der Schwangerschaft*, in *Centr. f. Gyn.*, 1890, No. 41, p. 743) performed ovariectomy during pregnancy in 7 cases; all his patients recovered, and were delivered at term, except one who was subject to repeated abortion.

§ S. Rémy. *Loc. cit.*

entail more danger for the mother than blind and excessive force exercised per vias naturales,* and one has the further advantage of being able to save the child.

* Nolting (Schwangerschaft und Geburt complicirt durch Ovarialtumor. Inaug. Dissert., Berlin, 1884) reports the case of a multipara having an ovarian tumour the size of the fist. When in labour a fruitless attempt was made to apply forceps; cyst punctured. Child stillborn; four days after the mother succumbed.—J. Williams (Note on the involution of the puerperal uterus in the absence of the ovaries, in Amer. Journ. of Obst., 1884, p. 778) performed ovariectomy successfully during labour.

CHAPTER IV.

SOLID TUMOURS OF THE OVARY.

Definition.—*Division.*—Fibroma. Pathological anatomy. Symptoms. Progress. Diagnosis. Prognosis. Treatment.—Sarcoma. Pathological anatomy. Symptoms. Progress. Treatment.—Epithelioma or Carcinoma. Pathological anatomy. Symptoms. Progress. Diagnosis. Treatment.

Definition. Division.—As a rule, under the name of solid tumours are included fibromata, sarcomata, and epitheliomata or carcinomata. Some writers add to them papilloma, enchondroma, and tubercle; I shall not follow their example. In point of fact, I have given the history of the first along with the papillary cysts, of which they are really only a dependency. Enchondroma has no proper clinical existence, and is an extremely rare pathological lesion (Kiwisch). With regard to tubercle, it is very exceptionally localised in the ovary, and when it gives rise to symptoms it is by provoking tubercular peritonitis or pyo-salpingitis, in which the microscope reveals giant cells and bacilli, but the symptomatic picture of which is confounded with that of the other forms of suppuration in the appendages where I have already alluded to it; I therefore refer the reader to the chapter on cystic oophoro-salpingitis.

FIBROMA.

Pathological Anatomy.—Fibroma of the ovary is rare. It does not form a limited circumscribed new growth, a kind of almost independent parasite of the neighbouring parts, as in the case of the uterus. It rather consists in a fibrous degeneration of this organ, which is so uniformly hypertrophied that its shape and its relations are not altered. Leopold* has rightly brought into prominence the fact that, with fibroma, the tube preserves its

* Leopold. Die Soliden Eierstocksgeschwülste (Arch. f. Gyn., 1874, vol. 6, p. 189).

entire independence instead of becoming a portion of the ovarian tumour, as is the case with cysts. Nevertheless if the tumour has extensively separated the layers of the broad ligament and become enclosed between them, this distinction disappears. Great difficulty may then be experienced in distinguishing between a fibroma coming from the ovary and one coming from the uterus, which has acquired the same connections.*

These tumours, when they are pure fibromata, are generally of small size. It is the fibro-sarcomata† and the fibro-myxomata‡ that reach to enormous dimensions. Nevertheless Alban Doran§ has removed a fibroma of the ovarian ligament that weighed no less than 16 pounds. The consistence of pure fibromata is hard, and their surface is tuberculated; they are almost invariably pediculated and free from adhesions on account of the ascites that they induce. A variety of fibroma, interesting from an anatomical point of view alone, is that affecting the corpus luteum, described by Rokitansky||; it is always of very small size. Nevertheless Klob¶ has seen one as large as a child's head. On section towards the surface is recognised the dentate arrangement of the corpus luteum, the characters of which may be made out by means of the microscope.

Ovarian fibroids are generally riddled with small lacunæ containing fluid; it is difficult to say whether these cavities arise from Graafian follicles, from limited spots of molecular disintegration, or from lymphangiectases.**

Calcification, and even ossification, of ovarian fibromata have been observed.††

The structure of fibromata is essentially fibrous in the proper

* Spencer Wells (Ovarian and Uterine tumours, French trans., Paris, 1883) even goes so far as to assert that the majority of so-called ovarian fibromata are only migrated uterine fibroids.

† O. Spiegelberg (Monatschr. f. Geb., 1866, vol. 27, p. 415) has described a fibroma weighing 30 kilogr. It was probably a fibro-sarcoma (Schröler).—Ch. Monod (Bull. et Mém. Soc. de Chir., Nov. 13, 1889, p. 728) removed from a woman, aged 50, a fibro-sarcoma as large as a melon, accompanied by much ascites.

‡ Martin (Clin. Treatise on Dis. of women, French trans., p. 590) removed in June, 1886, from the same woman two ovaries that had undergone fibro-myxomatous degeneration, and that weighed together 2,500 grms.

§ Alban Doran, B. M. J., June 8, 1889, vol. 1, p. 1287.

|| Rokitansky. Lehrbuch der path. Anat., 3rd edn., vol. 3, p. 428.

¶ Klob. Path. Anat. der Weibl. Sexualorgane. 4th edn., vol. 2, p. 127.

** Patenko. Ueber die Entwicklung der Corpora fibrosa in den Eierstöcken (Centr. f. Gyn., 1880, p. 441).

†† Waldeyer. Arch. f. Gyn., 1871, vol. 2, p. 440.

sense of the word; they show a large number of connective-tissue fibres, and few or no smooth muscular fibres. When the latter exist in large numbers it is very probable that the origin of the tumour has been misconstrued, and that it really has arisen from the uterus.* Exceptionally, the vessels may be of extraordinary size, as in the cavernous fibromata of Spiegelberg; but in these very vascular tumours there is often an admixture of sarcomatous tissue.

Fibromata of the ovary are met with relatively frequently amongst young women. Leopold mentions 13 cases of it from 5 to 30 years of age, and 4 only from 30 to 40 years of age; they are also met with in old age. Terrier† removed one by laparotomy from a woman aged 77.

Symptoms.—Attention is generally first attracted by the occurrence of ascites; it is produced by the great mobility of the tumour, similarly to what occurs with certain pediculated uterine fibroids. When this symptom is wanting the tumour may be undiagnosed, or may only be discovered by chance if the patient be examined bimanually, or if laparotomy be performed for some other reason.

The course is slow. A case of peritonitis from torsion of the pedicle has been reported (Van Burren). Some cases of inflammation have also been known (Rokitansky, Kiwisch, Safford Lee).

Diagnosis.—It is almost impossible to distinguish an ovarian fibroma from a pediculated uterine fibroid; ascites might also make one suspect that the tumour was malignant. Exploratory incision alone is capable of removing all doubt, and it is the more legitimate in that in all the cases the tumour ought to be removed.

The prognosis is favourable if the case be one of simple fibroma, which is a benign tumour. It must, however, be removed by laparotomy immediately it gives rise to pain, and even immediately it is recognised, for one is never absolutely certain that it is not after all a sarcoma.

* P. Bagot. Fibro-myoma of the ovary (New York Med. Journ., 1890, p. 248).—In the specimen removed by this Surgeon, Earl found a large number of smooth muscular fibres.

† Terrier. Progrès méd., 1888, p. 465.

SARCOMATA.

Pathological anatomy.—This form of new growth is very rare. According to the important statistics deduced from Schröder's ovariectomies, Cohn* estimates its frequency, compared with cysts, as 1 to 100. It is generally bilateral. The fasciculated or fibro-plastic variety is more common than the encephaloid or embryo-plastic; the former is of moderately firm consistency, the latter is much softer. Cystic cavities and foci of fatty degeneration are frequently seen in the thickness of the tissue. Many vessels may be seen in them. Generally of but moderate size, they may attain very considerable proportions. According to de Sinéty, with sarcomata there seem sometimes to have been confused proliferating cysts (mucoid epithelioma of Malassez), in which the solid element dominates. The description of a mixed variety akin to adenoma and to sarcoma (Olshausen) is perhaps not always exempt from this confusion.†

While considering the subject I must refer to some researches, interesting from the novelty of their results.

There has recently been described a variety of ovarian new growth, intermediate, from a histological point of view, between epithelioma and sarcoma, which has been met with by turns in certain degenerated dermoid cysts, in papillary cysts, and in those solid tumours riddled with small cavities that have hitherto been classified among the sarcomata. Eckardt‡ and Pomorski§ have called them endotheliomata, to clearly indicate their origin from the endothelium of the lymphatic spaces or capillaries, or even from capillary blood-vessels (Eckardt). It has been found possible to follow, step by step, the transformation of the connective-tissue elements into epithelioid cells on the one hand, and on the other the diffuse proliferation of the endothelial lining of the lymphatic spaces in the connective tissue. This

* Cohn. *Loc. cit.*, p. 19.

† Seeger (Ueber solide Tumoren des Ovarium. Inang. Dissert., Munich, 1888) has published three cases of "carcinoma sarcomatosum."

‡ Eckardt. Ueber endotheliale Eierstocktumoren (*Zeitschr. f. Geb. u. Gyn.*, 1889, vol. 16, part 2, p. 844).—This case was one of a dermoid cyst that seemed to have undergone sarcomatous degeneration.

§ J. Pomorski. Endothelioma ovarii (*Zeitschr. f. Geb. u. Gyn.*, 1890, vol. 18, part 1, p. 92).

neoplasm therefore is mixed, and has alliances both with the tumours of connective origin or the sarcomata, and with the

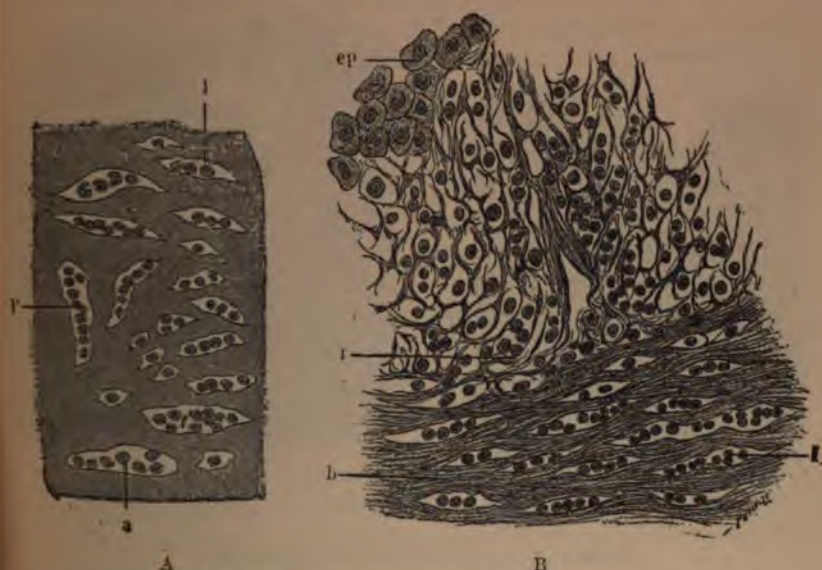


Fig. 362. Endothelioma of the ovary (Pomorski).

A. Commencing proliferation of the endothelium in the lymphatic spaces.

I, lymphatic space with endothelial cells in the midst of the interstitial substance which belongs to the connective tissues; *a*, alveolar dilatation of the lymphatic spaces; *b*, proliferation of the cells, which occurs in chains. (Hartnack, *oc.* 3, *obj.* 7.)

B. Reticular modification of the connective tissue under the influence of the endothelial proliferation.

I, lymphatic space of elongated form becoming changed into an alveolus; *b*, fasciculated interstitial connective tissue; *r*, transformation of the fibrillar connective tissue into a reticular network; *ep*, transformation of the epithelial cells into epithelioid cells; connection of the large cells with the mother-tissue (Same magnification).

tumours of epithelial origin or the epitheliomata* (figs. 362 and 363).

* The first description of tumours of this kind was given by Kolaczek, *Ueber das Angiosarcoma* (Zeitschr. f. Chir., 1878, vol. 9, pp. 1 and 165; *ibid.*, 1880, vol. 13, p. 1). He collected sixty cases published under the most varied names, having all of them the common characteristic of being derived from the walls of capillaries, of being endo- or peri-thelial formations. He called them "angiosarcomata." Kolaczek's observations refer almost exclusively to tumours of the head, starting from the forehead, the cheeks, or the jaw; not one refers to the ovary.—Golgi (*Sulla struttura e sullo sviluppo degli Psammomi*, Pavia, 1869. *Anal.* in *Virchow's Arch.*, 1869, vol. 51, p. 311) first called the tumours of this order by the name of "endotheliomata." From a

The first description of these ovarian tumours was given by Leopold.* Two other cases analogous from a histological point



Fig. 363.—Endothelioma of the ovary (Pomorski).

C. Stratification in parallel layers of the connective tissue; commencing alveolar formation.

p, cells arranged in chains; *f*, *f'*, fusiform cells, remnant of the fibrillar connective tissue; *ep*, direct transformation of the swollen cells into epithelioid cells; *a*, cell resulting from proliferation, situated between the epithelioid cells and not yet completely transformed; *a*, commencing stratification of the connective tissue, under the influence of the cellular proliferation in a large alveolus in process of formation. (Same magnification.)

D. Alveolus.

ep, direct transformation of the proliferation cells into epithelioid cells; *g*, giant cell; *f''*, fusiform cells forming a partition in the interior of the alveolus; *f'*, fusiform cells in the wall of the alveolus; *f*, connective tissue. (Same magnification.)

of view, though very different from that of macroscopic pathological anatomy, had been published by Marchand,† and still

purely histological point of view these formations will be compared with interest with J. Michel's researches. Beitrag zur Kenntniss der Entstehung der sogenannten Stauungspapille und der pathologischen Veränderungen in dem Raume zwischen äusserer und innerer Opticusscheide (Arch. der Heilk., 1873, vol. 14, p. 39).

* Leopold. Die soliden Eierstockgeschwülste (Arch. f. Gyn., 1874, vol. 6, p. 189).—He gives to them the name of "lymphangioma cystomatosum." Tumour found at the autopsy of a little girl aged eight years; as large as the head; on section a reticular network through which were scattered a large number of small cystic cavities.

† Marchand. Beitrag zur Kenntniss der Ovarialtumoren (Abhandl. der Naturf. Gesellsch., Halle, 1879, vol. 14, part 3). In the first case it was a bilateral papillary

looking back, the older cases of Olshausen,* and Ackermann, and of Flaischlen † may be included under the same heading.

From a collection of the known cases, it is seen that we have here to deal with a curious variety of sarcoma, either primitive (papillary tumour of the ovary or microcystic sarcoma), or secondary (degeneration of the wall of a dermoid cyst). The interest of these views is very great, but purely histological. From a clinical point of view, it seems that we have here to do with tumours of a high degree of malignancy.‡

The symptoms are those of a malignant tumour with rapid development.

Their surface is smooth, and the general shape of the ovary is preserved; the disease is sometimes bilateral.§

Pregnancy occasionally acts as a kind of stimulus to their growth. Münchmeyer,|| in a case where it had led to an enormous development of the tumour, was obliged to perform craniotomy. Ascites is invariable, and cachexia supervenes by strides. This galloping progress is the point that will serve to distinguish sarcoma clinically from fibroma. It also is most common in youth, and, as in the case of epithelioma, age renders no assistance in the formation of a diagnosis.

The only treatment is removal. Recurrence is more to be feared than with fibroma, but is less fatal than in epithelioma. C. Braun ¶ has reported a case of undoubted sarcoma of the

tumour in a woman aged 48; in the second nodules were scattered through an ovary as large as half an apple, found in an inguinal hernia.

* Olshausen. *Krankh. der Ovarien*, 2nd edit., p. 340. Tumour as large as the head found at the autopsy in a young woman aged 17, composed of a reticulated mass of capillaries, filled, not with blood corpuscles, but with round cells. The spaces of the mesh-work were filled with albuminous matter through which nuclei were scattered. According to Eckardt (*loc. cit.*) this is an undoubted case of intra-vascular endothelioma of the ovary, which he compares with his own case.

† Flaischlen. *Zur malignen Degeneration von Ovarialkystomen* (*Zeitschr. f. Geb. u. Gyn.*, 1882, vol. 7, p. 449). Multilocular dermoid cyst with apparently sarcomatous degeneration of the walls of the sac, in which the microscope showed that the connective new growth originated from the lymphatic spaces.

‡ P. Friedländer (*Inaug. Dissert.*, Munich, 1891) described a case of ovarian sarcoma with metastases in the peritoneum, the retro-peritoneal and bronchial glands, and in the liver.

§ Weinlechner showed at the Obst. and Gyn. Soc. of Vienna, March 26, 1889, the two ovaries of a young woman aged 21, weighing 600 and 700 grammes respectively, transformed into round-celled sarcoma (*Centr. f. Gyn.*, 1889, No. 36, p. 635).

|| Münchmeyer. *Dresden Gyn. Soc.*, July 4, 1889 (*Centr. f. Gyn.*, 1890, p. 186).

¶ C. Braun. *Obst. and Gyn. Soc. of Vienna*, March 26, 1889 (*Centr. f. Gyn.*, 1889, No. 36, p. 635).

ovary in which the recovery was maintained without recurrence for eleven years.

EPITHELIOMATA OR CARCINOMATA.

If secondary cancerous degeneration of cysts be excepted, primary cancer of the ovary is rare. It is nevertheless observed at all ages, even in infancy.

Pathological anatomy.—Two principal anatomical varieties are described; one diffuse and medullary, the other superficial and papillary.

There is not the slightest doubt that much confusion exists upon this last point, and that ruptured papillary cysts have often been described under the name of cancer or of cancerous papillomata. We must, with Cohn,* clearly distinguish the vegetations, though they may have to the naked eye similar appearances, according as the microscope reveals in them a carcinomatous or a purely papillary structure. A fact that renders the subject exceptionally difficult is the transition between these two varieties, which may be clinically and anatomically imperceptible.

Epithelioma or medullary carcinoma must be also, at any rate theoretically, clearly distinguished from proliferating glandular cysts with colloid and gelatinous contents, and containing small cavities, which may to the naked eye appear absolutely identical with it. Even under the microscope, exact diagnosis is sometimes very difficult on account of carcinoid changes in the cyst wall. In a word, it must be confessed with de Sinéty,† “that at the present time it seems impossible to draw a sharp line of demarcation between ovarian cysts and ovarian cancer.” Nevertheless, if that be absolutely true in a category of doubtful cases from an anatomical standpoint, the distinction is generally possible from a clinical standpoint, though even then one is very likely to make mistakes. Winter‡ has seen the Fallopian tube perforated, and its internal surface eaten away by cancer, starting in the ovary, but which nevertheless had become distended in such a way as to simulate a hydro-salpinx.

* Cohn. *Loc. cit.*, p. 28.

† De Sinéty. *Loc. cit.*, p. 758.

‡ Winter. *Obst. and Gyn. Soc. of Berlin*, June 24, 1887 (*Centr. f. Gyn.*, 1887, p. 497).

The symptoms are at first in no way characteristic. But soon the evidence of ascites, which is very often sanguinolent, the general failure of health and wasting, combined with the extraordinarily rapid progress of the tumour, leave no doubt as to the malignant nature of the growth. Edema of the lower extremities and thrombosis may occur, and lastly, metastatic generalisation sets in.

The diagnosis is rarely doubtful except in the early stages; it may be taken for an ovarian fibroma or a sarcoma. But the course of the disease soon solves all doubts.

With regard to treatment there are two opposite opinions. Some, amongst whom Schröder reckons himself, regarding the very meagre prospect of durable recovery offered by an operation and its much greater risk than if the tumour were benign, advise abstention and the use of palliatives. Others, considering that the surgeon can always procure for the patient a short relief, and even a temporary recovery, operate, however little possibility there may be of completely removing the growth. Spencer Wells, Gaillard Thomas, Ruge, Cohn, A. Martin, and Duvelius* all take this view, which I share. I believe with the last-mentioned authority that when in doubt, the surgeon is justified in making an exploratory incision, and that it is not then so serious a matter as Olshausen considers. In the only two cases in which I have resorted to it, the patient has, on the contrary, derived therefrom the benefit of seeing the ascites diminish during several months to a very considerable degree.

* See the discussion on this point at the Obst. and Gyn. Soc. of Berlin, Nov. 27, 1885 (*Centr. f. Gyn.*, 1886, p. 9).—See also above the bibliography given for the indications and contra-indications of ovariectomy.

CHAPTER V.

TUMOURS OF THE FALLOPIAN TUBES, THE BROAD LIGAMENTS, AND
THE ROUND LIGAMENTS.

Tumours of the tubes: Fibroma. Epithelioma or carcinoma and sarcoma. Papilloma.
—Tumours of the broad ligaments: Cysta. Fibroma. Lipoma. Epithelioma
and Sarcoma. Parovarian varicocele and phleboliths. Hydatids. Symptoms.
Diagnosis. Treatment.—Tumours of the round ligaments: Cysta or hydroceles.
Fibroma. Pathological Anatomy. Symptoms. Diagnosis. Treatment.

TUMOURS OF THE FALLOPIAN TUBES.*

FIBROMATA are rare and of small size; they develop towards the exterior, and as a rule do not diminish the calibre of the oviduct.

Epitheliomata or carcinomata and sarcomata of the tube are usually met with as an extension from a cancer of the ovary, and as an extension or metastatic formation from a cancer of the uterus. It is very remarkable sometimes to see an advanced cancer of the ovary, and the tube perfectly healthy. This fact is no doubt due to the direction of the lymph-stream (Olshausen). Out of 75 cases of uterine cancer, Kiwisch noted cancer of the tube 18 times, and Dittrich, out of a collection of 94 cases of cancer in various parts, only found malignant disease of the oviduct 4 times. This affection therefore is somewhat uncommon. Orthmann† collected 13 cases, in 9 of which the uterus was the starting-point, and in 4 the ovary. In one single case coming from A. Martin's wards, the carcinoma (epithelioma) of the tube was primary; it was a carcinoma of the vegetating papillary variety in a woman aged 51. I have only been able to collect very few other cases of undoubted primary cancer; one

* Cystic tumours have been described in the chapter on Cysts of the Ovary (Tubo-ovarian Cysts) and in that on Cystic oophoro-salpingitis (pyo-salpinx, hydro-salpinx, hæmato-salpinx).

† Orthmann. Gyn. Soc. of Berlin, April 27, 1888 (Centr. f. Gyn., 1888, No. 21, p. 845).

which was a sarcoma has been published by Senger.* A third, operated upon by Landau and shown by Gottschalk,† was also a sarcoma. A fourth carcinoma or epithelioma was Kaltenbach's.‡ A fifth came under the notice of Alban Doran.§ The ovary and the tube were the subjects of carcinoma, but the disease in the latter appeared clearly to be primary. The case was that of a woman, aged 48, who for three years had suffered from a watery and sometimes sanious vaginal discharge, and who, after a curettage that led to no results, had an attack of pelvic inflammation; the tumour of the appendages had not been apparent previously, but began to develop from this time.

It seems, from the recorded cases, that tubal cancer manifests itself chiefly about the time of the menopause, and that it runs a somewhat slow course. It soon gives rise to a sanious vaginal discharge that contrasts strongly with the integrity of the uterus.

A. Doran|| has described a papilloma of the tubes that he regards as benign, and which he compares to condylomata of the vulva and vagina. He believes that these formations are not neoplasms but simple hyperplasiae, due to a chronic inflammation of the organ. He has published two interesting cases of this lesion, but they are not sufficient to establish its correspondence to any definite clinical form of disease. It is very probable that here, as in the case of papillomata of the ovary, an anatomical variety apparently identical in both cases may, from some unknown cause, develop either into a benign or into a malignant tumour. Bland Sutton, who also admits papilloma of the tube as a special and benign anatomical variety, attributes much importance in their formation to gonorrhœa. If that be so, it is difficult to explain its excessive rarity. As a matter of fact papillomata must not be confounded with the foliaceous hypertrophy of the folds of the tubal mucous membrane, such as is found in certain cases of salpingitis.

* Emile Senger. *Centr. f. Gyn.*, 1886, p. 601.

† Gottschalk. *Soc. of German naturalists and medical men*, Berlin, 1886 (cited by A. Doran).

‡ Kaltenbach. *Centr. f. Gyn.*, 1889, No. 5, p. 74.

§ A. Doran. *Trans. Path. Soc. Lond.*, 1889 (*Anal. in Arch. de tocol.*, May, 1890, p. 226).

|| A. Doran. *Trans. Obst. Soc. Lond.*, 1886, vol. 28, p. 229.

TUMOURS OF THE BROAD LIGAMENTS.

Cysts have been considered at the same time as ovarian cysts, from which they are, clinically, indistinguishable.

Fibromata, independent of the uterus, have been observed in the broad ligaments. Have they developed primarily at the expense of the layers of muscular and connective tissues proper to these expansions, or are they not rather due to the migration of uterine fibroids? It is impossible to solve this question; the latter opinion has been upheld by Klob, Kiwisch, and Virchow; * on the other hand, Sänger,† Bilfinger,‡ and Freund, have demonstrated the autochthonous origin of cases upon which they operated.

Tédenat§ has seen a case of an enormous fibro-cystic tumour accompanied by other and purely fibrous tumours in the broad ligament.

* Virchow. Pathology of tumours, French trans., 1871, vol. 3, p. 412.

† Sänger. Ueber primäre dermoide Geschwülste der Ligamenta lata (Arch. f. Gyn., 1880, vol. 16, part 2, p. 258, and *ibid.*, 1883, vol. 21, p. 179).

‡ Bilfinger (Ein Beitrag zur Kenntniss der primären dermoiden Geschwülste in den breiten Mutterbändern. Inaug. Dissert., Würzburg, 1887) reports the case of a fibroma as large as a goose's egg found at the autopsy of a woman, aged 56, the primary origin of which was beyond doubt. The author gives a table of the 13 certain cases of this lesion hitherto known.

§ Professor Tédenat, of Montpellier, has been kind enough to communicate to me the following unpublished case:—"Fibro-myomata of the broad ligaments, weighing 7 kilogrammes, after evacuation of a cysto-myoma containing 8 litres of fluid; uterus normal. Woman aged 48, mother of two children. The abdomen began to enlarge seven years ago. Menstruation regular, slightly lessened flow. Obstinate constipation. Lumbar pain. For two years the great size of the tumour had impeded breathing. On examination, a large fluctuating tumour having, with a small and movable uterus, the ordinary relations of an ovarian cyst. In Douglas' pouch movable masses slipped away beneath the finger. Laparotomy. Removal with difficulty of tumours of the uterus and the appendages; the fibro-myomata adhered to the pelvic walls. Considerable hæmorrhage. Death after twenty hours. The cysto-myoma developed in the right broad ligament spread to the right and in front of the uterus. It contained 8 litres of fluid. Its wall, from 1 to 5 cm. in thickness, had a pink external surface and a red, reticulated, lobular internal surface. From its postero-external portion there hung by a pedicle, 3 cm. in length and 3 cm. thick, a pale pink flaccid tumour the size of the two fists. Behind these two large masses were a dozen tumours of various sizes (hen's egg, fist, large pear, kidney) enclosed between the layers of the broad ligament, and united one to another by a loose tissue, which allowed of great mobility. They were not in continuity with the uterus, which was small and normal. The tumours were typical fibro-myomata, certainly originating in the broad ligament, and looser in structure than ordinary uterine myomata."

Accessory ovaries, the possible existence of which has been pointed out by Waldeyer and Beigel,* must not be mistaken for small fibromata. They are situated above the normal ovary, and they rarely reach and never exceed a cherry in size.

Lipomata have been very occasionally found in the broad ligament. I once saw a case that had been taken for an ovarian cyst by reason of its pseudo-fluctuation. The tumour was enormous, and filled the whole of the abdomen. The patient died suddenly of embolism three days after an exploratory puncture. Terrillon† has operated in a case where the enormous tumour, weighing 57 pounds, had its origin in the mesentery. These sub-serous tumours leave after their enucleation a large cavity that must be treated upon the lines I laid down when speaking of intra-ligamentous fibroids of the uterus.

Epithelioma and sarcoma.—These neoplasms are here only the result of extension from neighbouring tumours, having their seat either in the peritoneum, or in the ovary, or in the uterus. Bandl has seen a few cases in which the cancer has extended from infected pelvic glands.

Parovarian varicocele. Phleboliths.—Pointed out by Richet‡ and his pupil Devalz,§ varicose dilatation of the utero-ovarian veins were found no fewer than 10 times in 300 of Winckel's autopsies. It is certain that in the living they must be incomparably larger than in the dead subject. Winckel|| has seen thrombi in them, Klob and Bandl have found phleboliths.

Hydatids.—Freund¶ has devoted an important paper to the study of these parasites in the female pelvis. They undermine all the cellular interstices that communicate with the superior pelvi-rectal space, into which they seem first of all to be introduced, and may thus reach the broad ligament, pass into the iliac fossa, and thence pass out of the pelvis above or below the

* Waldeyer. *Loc. cit.*—H. Beigel. Ueber accessorische Ovarien (Wien. med. Woch., 1887, No. 12, p. 265).

† Terrillon. Bull. de l'Acad. de Méd., Oct. 6th, 1885, and Lect. on Clin. Surg., 1888, p. 460. The patient succumbed to suppuration.

‡ Richet. Treatise on medico-chir. anatomy, 1854, p. 753.

§ S. Devalz. On ovarian varicocele, &c., Thesis, Paris, 1858.

|| Winckel. Lehrb. der Frauenkr., 2nd edit., 1890, p. 719.

¶ W. A. Freund. Die Echinococcenkrankheit im weiblichen Becken (Gyn. Klin. 1885, p. 299).—Cf. also Charcot. Mém. de la Soc. de Biol., 1852, vol. 4, p. 101.—C. Davaine. Treatise on entozoa, 2nd edit., Paris, 1877.—F. Villard. Annal. de Gyn., 1878, vol. 9, p. 101.

crural arch. Around them they induce a chronic inflammation with induration of the connective tissue.

The local symptoms may be none, with the exception of compression-phenomena, and the general health undergoes no deterioration. The tumours are rounded, elastic, are situated probably in the neighbourhood of the rectum, in the posterior portion of the pelvis, are but slightly movable, and are not painful. By bimanual palpation their independence of the uterus and the ovaries can be recognised. It is somewhat dangerous to make an exploratory puncture, as it may be followed by inflammation of the cyst. The diagnosis can scarcely be made but by exclusion, and with ideas furnished by medical geography, which has taught us the great relative frequency of occurrence of hydatids in certain countries (Iceland, Mecklenberg, &c.).

The treatment varies according to the position of the tumour. If it be of large size, and project into the abdomen, laparotomy will allow either of the complete enucleation of the cyst, or of its suture to the abdominal wall, combined with plugging and drainage. For small pelvic tumours, the surgeon should not interfere unless he be obliged by the occurrence of compression phenomena. In that case he should incise the posterior vaginal cul-de-sac directly over the tumour. The cyst might also be reached in suitable cases by perineotomy or a para-sacral incision. If it has been necessary to open the peritoneum, it should be plugged with iodoform gauze for from 24 to 48 hours, immediately the cyst is reached and before opening it, so as to assure hæmostasis and the formation of protective adhesions. The second stage of the operation consists in freely incising the cyst, which must be rendered perfectly antiseptic.

TUMOURS OF THE ROUND LIGAMENTS.

Cysts or hydroceles.—An accumulation of serum may be found encysted in the interior of the inguinal canal, or at its external orifice. It was quite natural to attribute this condition to persistence of the peritoneal canal of Nuck, which surrounds the round ligament during intra-uterine life. This origin, accepted

by many writers,* is denied by Professor Duplay.† Nevertheless, Schröder‡ asserts that in a case seen by him the fluid could be pressed back into the abdomen, which seems to demonstrate a communication of the cyst with the peritoneum, and an origin similar to that of congenital hydrocele in the male. Whether this be the origin or no, there is another one that may be invoked. Sometimes the cyst may be situated in the very interior of the round ligament. It is known that Hunter's gubernaculum, which later becomes in the female the round ligament, is, according to E. H. Weber,§ primarily hollow; the condition might therefore depend upon the persistence of the foetal arrangement favouring the production of a pathological alteration.||

I shall return to the symptoms, the diagnosis, and the treatment when dealing with the inflammations and cysts of Bartholin's gland.

Fibromata.—These may occur as fibromata proper, or as fibro-myomata,¶ fibro-myxomata,** or fibro-myxo-sarcomata.†† Duncan has found calcareous degeneration in them. Leopold once found a lymphangiectatic myoma in the round ligament.

Their most common seat is on the right side (8 times out of 11 cases according to Sänger), and they occur almost invariably in women who have borne children. The tumour may be situated within the internal orifice, being intra-peritoneal (three cases known cited by Winckel, Duncan, Kleinwachter), or be external in the labium majus, or towards the fold of the groin. Independent of the integument, often provided with a pedicle, sometimes sessile, the mass, of variable size, is smooth or slightly lobulated, and generally of fibrous consistency; painless on pressure, it

* Zuckerkandl (cited by C. Hennig. *Arch. f. Gyn.*, 1885, vol. 25, p. 103) found Nuck's canal patent four times in young girls, varying from one to twelve years; three times it was bilateral.

† S. Duplay. On serous and hydatid collections in the groin, Paris, 1865, and *Treatise on external pathology*, 1887, vol. 7, p. 721.

‡ Schröder. *Loc. cit.*, p. 455.

§ E. H. Weber. Cited by Bandl and by Schröder, *loc. cit.*

|| Cf. on the origin of these cysts Staffel. *Ueber Cysten des Canalis Nuckii* (*Centr. f. Gyn.*, 1887, p. 272).

¶ Winckel. *Loc. cit.*, p. 711.

** S. Duplay. Contrib. to the study of tumours of the round ligament (*Arch. gén. de méd.*, March, 1882, p. 257 and foll.).

†† M. Sänger. *Arch. f. Gyn.*, 1883, vol. 21, p. 279, and 1884, vol. 24, p. 1.

produces pain by the pressure it itself exerts when it has reached a certain size. Cough and expiratory efforts make no alteration in the position of these fibromata. It is only at an early stage, when they are very small and placed externally, that they can sometimes be partly reduced into the inguinal canal. They have been known to increase in size under the influence of pregnancy, and even at each menstrual period. The course, very slow in the case of pure fibromata, may, in the case of the mixed tumours, present the rapidity characteristic of malignant growths.

From a diagnostic point of view, with Duplay we must distinguish those cases in which there is a pedicle from those cases in which it is absent. If a pedicle be present, and if it come below the crural arch, the case cannot be one of a new growth in the round ligament. If it pass above the arch, the tumour may belong to the ligament, or be a fatty hernia, an epiplocele, or a hernia of the ovary. The differential diagnosis will be established by the following considerations: a fatty hernia often diminishes in size under pressure, it is tender on touch, and during walking exercise its consistency is soft, and it has ill-defined edges. Irreducible epiplocele, which sometimes acquires a consistency comparable to that of a fibroma, would be impossible to distinguish from it were it not for the history and the presence of a tense omental cord behind the abdominal wall. A herniated ovary is oval in shape, has the regular form of the organ, and is exquisitely tender on pressure; increase of size during menstruation is much more marked than that which may be observed with some fibromata; the uterus is in a position of extreme latero-version.

If the tumour have no pedicle, and have developed in the groin, it may be taken for a mass of glands. But in the latter case the tumour is always multilobular, and has no special connections with the inguinal ring. If the neoplasm be situated in the labium majus, it may be mistaken for a cyst of Bartholin's gland; its point of origin should then be carefully sought after, not only by means of direct examination, but also by consideration of the history. If the tumour have started above the labium and afterwards descended into it, and if its insertion over the external inguinal orifice may be clearly made out, there is no doubt the case is one of a tumour of the round ligament.

Prognosis is indicated by the progress.

The treatment is removal : it is generally easy to enucleate the fibromata when they are situated at the external orifice. Those which are pre-peritoneal, behind the internal orifice, and are of considerable size, may require the performance of a serious operation.

BOOK XI.

TUBERCULOSIS OF THE GENERATIVE ORGANS.

Historical Survey.—**Ætiology and pathogenesis.** Primary tuberculosis of the generative organs. Direct infection. Mixed infection. Secondary tuberculosis of the generative organs. Metastatic secondary infection. Tuberculosis of the vulva, of the vagina, of the cervix. Pathological anatomy. Diagnosis. Treatment.—Tuberculosis of the uterus. Pathological anatomy. Symptoms and diagnosis. Treatment.—Tuberculosis of the ovaries and of the tubes. Pathological anatomy. Symptoms. Treatment.

INVASION of the generative apparatus by the tubercle bacillus is somewhat rare. Certain regions, *e.g.*, the vagina and the cervix, appear to be very refractory to it, no doubt on account of the resistance of the stratified epithelium that protects them. It is the tubes that are generally the starting-point of tubercular lesions. From the tubes the disease readily passes to the ovaries, and more rarely it descends down into the uterus itself.

I shall present a general picture of tuberculosis of the generative organs, adopting for it their anatomical arrangement.

Historical survey.—The writers of the chief works that it is necessary to mention are Louis, Senn, Raynaud, and Cruveilhier; they mark the first stages on the road. With Aran, Bernutz, and above all, Brouardel,* the pathological anatomy, although still compelled to accord a preponderating importance to the macroscopic appearances, becomes more precise, while the clinical part of the subject has already advanced by strides. Then the discovery of the tubercle, followed by that of the bacillus tuberculosis by Koch, gave a certain criterion to research, while at the same time an increasing surgical boldness made it possible to study the lesions on fresh specimens. The names of Hegar,

* Louis. Researches on phthisis, Paris, 1825.—Senn. Arch. gén. de méd., 1831, vol. 27, p. 282.—Raynaud. Ibid., vol. 26, p. 186.—Cruveilhier. Gen. path. anat., vol. 4, pp. 674 and 718.—Aran. Clin. Lect. on Dis. of the Uterus, 1858, p. 710 and foll.—Bernutz. Clin. Med. of the Dis. of Women, Paris, 1861-2, vol. 2, p. 340.—Brouardel. Tuberculosis of the female generative organs. Thesis, Paris, 1865.

Wiedow, Cornil, and Terrillon* are connected with the latest work published upon the pathological anatomy of the condition and its treatment.

From the point of view of pathogenesis, it is necessary to mention the names of Cohnheim,† who was the first to start the idea of a possible transmission by the sexual act; Verneuil,‡ who has vigorously supported this opinion, and has demonstrated the importance of "confrontation" of the inoculated person with the inoculator, a method which had led to a much better understanding of the causation of syphilitic accidents; Verchère,§ a pupil of Verneuil, Fernet,|| and Derville,¶ who have reported very probable cases of genital contagion; and lastly Reclus, who has discussed them.

Etiology. Pathogenesis.—Is there such a thing as primary tuberculosis of the generative organs? There can be no doubt that there is. Geil** and Tomlinson,†† giving precision to the opinions previously put forward by Namias,‡‡ Cristoforis,§§ and Rokitsansky,||| long ago reported numerous examples of isolated tuberculosis of the appendages. It must be confessed

* Hegar. Die Entstehung, Diagnose und chir. Behandlung der Genitaltuberculose des Weibes, Stuttgart, 1886.—Wiedow. Die operative Behandlung der Genitaltuberculose (Centr. f. Gyn., 1885, No. 36, p. 561).—Cornil. Journ. des connaissances méd., June, July, 1888.—Terrillon. Tubercular Salpingo-ovaritis (French Congr. of Surgery, 4th Session, 1889, p. 113).

† Cohnheim. Tuberculosis from the infective point of view, trans. by De Musgrave Clay, Paris, 1882.

‡ Verneuil. Letter to Prof. Fournier (Gaz. hebdomadaire de médecine et de chirurgie, April 6, 1883, p. 225).

§ Verchère. The entrance points of tuberculosis. Thesis, Paris, 1885.

|| Fernet. On tubercular infection through the generative tract. (Bull. Soc. médecine des hôpitaux, 1884, p. 420).—Fernet and Derville. Tuberculosis of the generative organs and its infectiveness. Communication to the Clinical Society (France médicale, 1886).

¶ L. H. Derville. On tubercular infection by way of the generative tract in women. Thesis, Paris, 1887.

** Geil. Ueber die Tuberculose der weibl. Genitalien. Inaug. Dissert., Erlangen, 1851.

†† Tomlinson. Obstet. Trans., 1864, vol. 5, p. 174.

‡‡ Namias. Sulla tubercolosi dell' utero e degli organi ad esso attinenti (Memor. dell. Instit. Stesso, Venice, 1851-61, vols. 7 and 9).

§§ M. de Cristoforis. Anal. univers. di medicina, 1858, vol. 65, p. 543.

||| C. Rokitsansky. Lehrbuch der pathol. Anat., 3rd edit., 1861, vol. 3, p. 444.—Lenherdt (Primäre Tuberculose der Tuben bei einer 67 jährigen Frau, in Beiträge der Berl. Gesell. f. Geb., vol. 1, p. 32) has reported a case of primary uterine tubercular disease with obliteration of the uterine orifice; considering the age of the subject this had perhaps occurred before tubercularisation.—Derville (*loc. cit.*) reports numerous cases of primary tubercular disease of the generative organs, but the interpretation of some of them appears to be doubtful.

that cases reported previous to the specific determination of the characters of a tubercle, and of the characteristic bacillus, have not a decisive importance. But more recent examples have conclusively proved that such cases do sometimes occur.*

Primary tubercular disease of the generative organs is also fairly common in the male.† One of the most curious points about this variety of local tuberculosis in the two sexes is that it may long, or even indefinitely, remain latent and undiagnosed on account of its strict limitation by thickened membranes and inspissation of the pus. This is notably to be observed in the Fallopian tubes, and it may even be impossible then to find any bacilli, which no doubt have become destroyed owing to lapse of time, although the tubercular nature of the focus may be clearly demonstrated after operation by the onset of acute miliary tuberculosis, either of the lungs or of the meninges of the brain. The history of old tubercular foci in the bones or joints furnishes the surgeon with many analogous examples.

How is the bacillus tuberculosis introduced into the female generative organs? Their free communication with the exterior seems, *a priori*, likely to allow of constant infection, either through the atmosphere, or through the introduction of infective bodies, or through the introduction of tubercular semen. This idea could not be admitted, of course, before Villemin's and Koch's works overthrew the prevalent opinion upon the origin of tuberculosis. Even at the present day this theory of "direct infection" is not accepted without a word. It seems that there have been at one and the same time supporters of the doctrine with too much enthusiasm, who have been disposed to accept it without sufficient demonstration in many doubtful cases, and also

* Predöhl (Obst. Soc. of Hamburg, Jan. 31, 1888, in *Centr. f. Gyn.*, 1888, No. 20, p. 331) has given a striking example of an old woman, aged 61, who had had diarrhoea for a year and a half, and suffered from pain in the left side of the lower abdomen, and who died suddenly of meningitis. At the autopsy double caseous salpingitis and great thickening of the uterine mucous membrane were found. Although no bacilli could be found, there is scarcely any room for doubt that it was a case of old tubercular disease; no tubercles were found in the peritoneum, but they were present in the meninges and in the liver. The priority of the tubal lesions seemed clear.—Dudefoy (Bull. Soc. Anat., March 15, 1889) showed advanced lesions in the tubes of a patient who died of very rapid tubercular meningitis; it is justifiable to allow with him that the salpingitis was tubercular and the primary condition.

† P. Reclus. Tubercular disease of the testicle and tubercular orchitis. Thesis, Paris, 1876.—Schachmann. Points of entrance and modes of propagation of the tubercle bacillus (*Arch. gén. de méd.*, 1885, 7th series, vol. 15, p. 584).

systematic opponents. In a word, this seems to be a very probable mode of infection, although, no doubt, it is the exception.

Investigations have been carried out to discover the comparative frequency of these cases of primary tuberculosis with reference to cases of secondary tuberculation. Mosler* found 8 primary cases out of 46, Frerichs† gives 15 out of 96 as the proportion, and Schramm‡ only 1 out of 34.

With regard to the agents of infection of patients in primary tuberculosis, it is easy to recognise them if they are in contact with persons afflicted with phthisis; a cloth, a syringe, the finger of a medical man or of a midwife may carry the organisms. Cohabitation with a man having tubercular disease of the generative organs or of the lungs seems to be an undoubted cause in many cases.§ Is it then by means of the semen, or the saliva, or the blood from some excoriation that inoculation takes place? One cannot very well say. The puerperal state plays an undoubted part in primary infection, and this is recognised by all writers. The generative tract is then freely open to the entrance of all kinds of pathogenic micro-organisms, and obstetric operations themselves may contribute towards their introduction. Moreover, it must be noted

* Mosler. Die Tuberculose der weibl. Genitas. Inaug. Diss., Breslau, 1883.

† E. Th. Frerichs. Beitr. z. Lehre von der Tuberculose, Marburg, 1882.

‡ Schramm. Zur Kenntniss der Eileitertuberculose (Arch. f. Gyn. 1882, vol. 19, p. 416).

§ Cases of Fernet, Verneuil, &c., cited by Schramm, *loc. cit.*, p. 584.—Two cases may be distinguished from this point of view, according as the infecting individual presents tubercular disease of the generative organs, or only that of other parts.—In the first case it is necessary to admit that the semen may contain bacilli. Cornil and Bahès have in point of fact found bacilli in the urine of persons affected with tubercular cystitis; Rosenstein demonstrated the same fact in a patient who had caseous epididymitis only. We may therefore, in the absence of a positive examination of the semen, suppose that it is infected when passing through the urethra. There remains a large number of cases in which direct tubercular infection has been supposed to have been produced by a man who had the lungs alone affected. The virulence of the semen then only rests upon hypothesis. Landouzy's and Martin's experiments (Clinical and experimental facts relating to the heredity of tuberculosis, in Rev. de Med., 1883, p. 1014, and Exper. and clin. study of tuberculosis, 1887, part 1, p. 59) are not completely convincing. Curt Jani's researches (Ueber das Vorkommen von Tuberkelbacillen im gesunden Genitalapparat bei Lungenwundsucht, &c., in Virchow's Arch., 1886, vol. 103, p. 522) really show that a few bacilli may be found in the testicles and prostate of phthisical patients when those organs are apparently healthy. But it is almost certain that they are there within capillary blood-vessels, and there is no reason to believe that they can traverse their walls and escape with the secretions. Grawitz fully proved the passage of corpuscular elements and spores of moulds (larger than bacilli) through the glomerular epithelium, without alteration; but reasoning from simple analogy has never any more than a hypothetical value.

that an infection of any nature whatsoever, septicæmic or blennorrhagic, predisposes to tubercular infection. It is well known how greatly the puerperal condition predisposes to the first of these, and they may, so to speak, prepare the road for the tubercle bacillus. Such facts are well known in general pathology under the name of mixed or combined infection (*Mischinfection* of the Germans).

Secondary infection of the generative organs, that is to say, developed during the course of the tubercular degeneration of some other organ, and in particular of the lungs, is incomparably more common than primary tuberculosis. Before asserting that the case is one of the latter class, one must make absolutely certain that there does not exist at the apex of the lung the smallest tubercular nodule, and how difficult it is to assert this is well known. This is no doubt the joint in the harness of many cases, so-called demonstrative, that have been published: another of their weak points has been that the tubercular nature of small indurations in the epididymis or in the prostate of the supposed authors of the infection has been admitted far too easily; and thus in many cases there is a begging of the whole question.

Tuberculosis of the generative organs supervening in the course of pulmonary phthisis, one from an ætiological point of view, comprises two varieties from a pathogenetic point of view. In the majority of cases, no doubt, genital tuberculosis is "secondary and metastatic," to use the expression of Cohnheim, and the micro-organism has emigrated with the blood or the lymph from the first to the second focus. But in other cases there occurs contamination by a different mechanism allied to that occurring in the primary infection of non-tubercular individuals. It may be called "secondary primitive infection." The patient then infects her generative organs through the medium of her external surroundings that she has herself already infected. It is, no doubt, from linen soiled with diarrhœic matters, or with expectoration, that the vagina of advanced tubercular patients becomes infected when they present ulceration of this part.*

Lastly, tubercular infection may take place by continuity of tissue, by contact, or by propagation, by means of the lym-

* Weigert. Virchow's Arch., 1879, vol. 67, p. 264.—Klob. Path. Anat., &c., p. 482.

phatics, in cases of intestinal tuberculosis which has led to disease of the pelvic lymphatic glands. Bacilli in the peritoneum may also infect the abdominal extremities of the tubes. Pinner* has shown that pulverised materials introduced into the peritoneum are rapidly drawn into the tubes, and thence into the uterus. The same must occur with micro-organisms, and Jani† definitely found, in a case of pulmonary and intestinal phthisis, many bacilli in sections of the tubes that were still perfectly healthy. No doubt they came from the peritoneum, which they had reached after migration from the intestine. The tube also becomes infected if it be adherent to a coil of tubercular intestine, in the same way as a tubercular recto-vaginal fistula may follow upon perforation of the partition in cases of ulceration of the large intestine.

The predilection of tubercular lesions for the tubes is explained by several considerations. Their mucous coat being very rich in folds, not subject to the menstrual shedding like that of the uterus, is admirably adapted for the fostering of any morbid micro-organisms that may have gained access to it. The intense vitality of the uterine mucous membrane, its partial desquamation at every menstrual period, is no doubt its chief defence against the attacks of bacilli. With regard to the vagina, it is protected by a thick layer of stratified epithelium, and possibly also by the invariable concurrence of the many micro-organisms to which it always gives shelter. According to Verneuil's judicious remark, no comparison can be drawn between the conditions of growth of the bacillus tuberculosis, which is anaerobic, and develops by preference at a considerable depth from the surface, and those of other micro-organisms which, like the gonococcus, attack the first portion of the genital canal with which they come into contact.

TUBERCULOSIS OF THE VULVA, OF THE VAGINA, AND OF THE CERVIX.

Pathological anatomy.—Tubercular ulceration of the vulva is quite an exceptional lesion. Zweigbaum,‡ who described one

* Pinner. Arch. f. Anat. u. Physiol., 1880 (Phys. Abth.), p. 241.

† Jani. Loc. cit., p. 522.

‡ M. Zweigbaum. Ein Fall von tuberk. Ulceration der Vulva, Vagina, und der Portio vaginalis Uteri (Berl. klin. Woch., 1888, No. 22, p. 443).

case, was only able to find two cases in the whole range of medical literature. His patient, 32 years of age, was phthisical, and succumbed to pulmonary and intestinal tuberculosis. The writer, however, believes that the genital lesion was primary. There was also ulceration of the vagina and of the cervix uteri. Bacilli were discovered in abundance in a small strip excised during life from the vulvar ulcerated surface.

Cases of tubercular lesions of the vagina, or of the vaginal



Fig. 364.—Tubercular disease of the uterus, the vagina, and the tubes (Barnes).

a, b, tubercular masses in the mucous membrane and the uterine tissue; *c*, tubes converted into pyo-salpinges; *d*, ulcerations in the vagina.

cervix, are rare. Daurios,* however, has collected 24; but it must be acknowledged that they are not all of them beyond criticism. The external appearance, or certain presumptions drawn from various circumstances, are not sufficiently conclusive to characterise this particular change. Nevertheless there is a certain number of incontestable cases.

* Daurios. Contribution to the study of tuberculosis of the generative apparatus of women, Thesis, Paris, 1889.

Mention only need be made of miliary tubercles, which may be found in the course of acute tuberculosis.

A special paragraph must be devoted to the primary or secondary tuberculisations of certain fistulæ forming communications between the vagina and neighbouring hollow organs.

I have only found one single example of isolated primary ulceration of the vagina, observed by Max Bierfreund.* As a general rule this lesion co-exists with primary disease in the tubes or in the uterus.† In a remarkable case of Virchow's,‡ there was tuberculosis of the urinary tract, and the vagina had

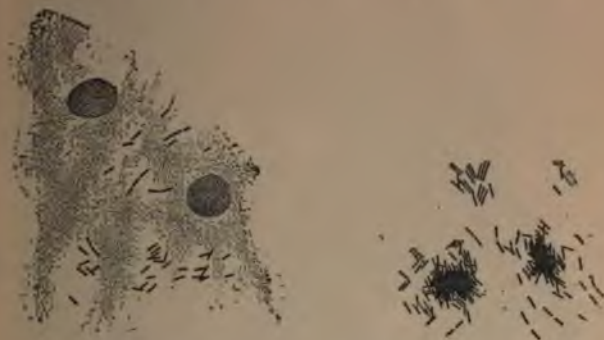


Fig. 365.—*Bacillus tuberculosis*.

A, phthisical sputum; two granular leucocytes and many bacilli are visible.

B, pure culture of the bacillus.

become infected through the urine. The rectum may also be the point of origin.

A tubercular ulcer of the vagina has precipitous, unequal, and rugged edges, a depressed floor, which is greyish-yellow in colour, and is covered with a very characteristic caseous material. Around the ulcer there are often to be seen small yellow opaque masses, absolutely similar to those surrounding tubercular ulcers of the tongue, and so well described by Trélat. If the specific bacillus be found on the surface of these ulcers,

* Max Bierfreund. Ein Fall von Tuberculose der Vagina ohne gleichzeitige Tuberculose der übrigen Beckenorgane (*Zeitschr. f. Geb. u. Gyn.*, 1888, vol. 15, part 2, p. 425).

† Späth. Ueber die Tuberculose der weiblichen Genitalien. Inaug. Dissert., Strassburg, 1885.

‡ Virchow. *Arch. f. path. Anat.*, 1853, vol. 5, p. 404.

or in the vaginal secretion, no doubt can be felt as to the nature of the lesion, but its presence cannot always be demonstrated.



Fig. 366.—Tubercular disease of the cervix. Section of the surface of the mucous lining of the cervical canal (x 80).

m, mucus on the surface of the mucous coat, and in the depressions between the folds composing the arbor vitæ; *p*, projections of the arbor vitæ and villousities covered with a cylindrical epithelium; *g*, *g*, *g*, glands and depressions between the folds composing the arbor vitæ; *a*, *a*, *a*, giant cells situated in the connective tissue of the mucosa in the middle of microscopic tubercular nodules (Cornil).

These tubercular ulcers heal up temporarily under simple treatment, such as painting with tincture of iodine or with lactic acid; but they soon recur, for, along with a superficial



Fig. 367.—Tubercular disease of the cervix. Same section as in the preceding figure (x 100).

m, mucus; s, surface of villi and papillae; g, mucous glands, lined with cylindrical epithelium; v, vessel; c, giant cell, situated in the inflamed connective tissue; p, a papilla, partly covered with epithelium, the connective tissue of which (t) is inflamed and is infiltrated with numerous small cells. (Cornil).

ulceration of the cervix, one may find present tubercular granulations that have invaded the muscular layers.

Tubercular fistulæ of the vagina, according to Daurios,* may be vesico-urethral or recto-vaginal. They have no characters to distinguish them clearly from ordinary fistulæ occupying these same regions. Their specific nature can only be recognised by

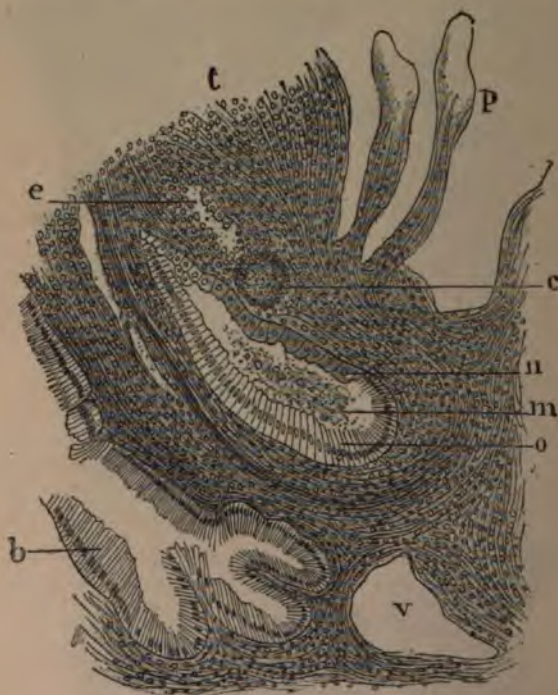


Fig. 368.—Tubercular disease of the cervix. Same section as in the preceding figures, further magnified. (x 150).

p, papillæ and superficial vegetations; *t*, connective tissue containing many round cells; *e*, cleft in a portion of tubercular growth, where the epithelioid cells belonging to a tubercular nodule are to be seen; *c*, giant cell; *n*, epithelial lining of a gland close to a tubercular nodule, and showing large square epithelial cells; *o*, epithelial lining formed of columnar cells; mucous contents of a gland; *b*, greatly elongated epithelial cells of a gland; *v*, vessel. (Cornil.)

the presence of tubercular nodules, or of their bacillus around the orifice.

Cases of tubercular disease limited to the cervix uteri are not

* Daurios (*loc. cit.*), pp. 26 and 131.

numerous; a case of this kind, however, has been published by A. Laboulbène.* Another, fully described by Cornil,† deserves to be cited as a remarkable type of this rare lesion. I shall therefore borrow the description given by the eminent Professor.

The case was one in which Péan had performed complete hysterectomy. The clinical diagnosis of the lesion had remained doubtful. The appearance of an hypertrophied and indurated cervix, covered with irregular vegetations, and bathed in a thick, yellowish, grumous, mucous fluid, strongly suggested malignant disease, and Péan removed the uterus. "On opening the cervical canal, the folds of mucous membrane forming the arbor vitæ were found to be very prominent, vegetating, and agglutinated by a thick mucus in which were some opaque masses. Histological examination revealed that the case was one of tuberculosis of the cervix uteri limited to this portion of the organ. This specimen is extremely interesting by reason of its very rarity, and of the strict limitation of the tubercular process. When sections, cut, after hardening in alcohol, perpendicularly to the surface of the mucous membrane, are examined under a low power (fig. 366), the folds of the arbor vitæ show secondary villousities separated by deep depressions, in which open the utricular or compound glands of the cervix. The surface of the mucous membrane, as also the depressions and glandular cavities, are lined with and full of mucus. At the same time the glandular cavities are enlarged, and the connective tissue is infiltrated with small cells. In this connective tissue on the surface of the mucous membrane, even at the very summit of the folds of the arbor vitæ, in the superficial layers as well as a little deeper between the glands, giant cells may be distinguished sufficiently large to be seen even with this low power. The surface of the mucous coat, the bases of its folds, of its villousities, as well as the cavities of the glands, are protected by long cylindrical cells. With a higher power (figs. 367 and 368) between the glands, in the connective tissue of the mucous membrane, are to be seen perfectly characteristic giant cells, in which are included many small cells; these giant cells seem alone to constitute the whole of the tubercular lesion.

* Laboulbène. Elements of path. anat., p. 860 (fig. 249).

† Cornil. Lectures on the pathological anat. of metritis, &c., 1889, p. 78.

It is true that the connective tissue around them is richer in round cells than is ordinarily the case; but even in the physiological state it contains many of them, and cervical endometritis alone is sufficient for it to contain quite as many as in this case of tubercular disease. Moreover, as a rule, around the giant cells there exists no agglomeration of epithelioid cells, nor any accumulation of cells undergoing granular degeneration, whence it results that the tubercular foci, observed in this case at a period not far removed from their date of origin, were not visible to the naked eye at all.

"The tubercular formations developed on the surface of the mucous coat forming the exterior covering of the infra-vaginal cervix, that is to say in its vaginal portion where it is covered with pavement epithelium, presented in this specimen the same appearances as are seen in tubercles of the pharyngeal mucous membrane; the tubercular nodules are seen on the surface of the mucous corium; giant cells are found in the midst of an accumulation of small cells; these granulations are covered at first, and for some long time by the normal layers of stratified pavement epithelium. Beneath the mucous membrane tubercular nodules are found in small numbers situated in the midst of the interlacing muscular bundles. These muscular bundles are at a given point separated from one another by some embryonic tissue forming an island, in the centre of which there is one or more giant cells surrounded by epithelioid cells. These tubercular granulations are larger than those on the surface of the mucous membrane. There they have an arrangement perfectly analogous to that which is observed in the muscular layers of the intestine or in the lingual muscle, that is to say, they had developed in the inter-fascicular connective tissue and pushed the muscular fibres away at the periphery by their extension. We must therefore expect, even when we believe that we have to do with a slight superficial tubercular formation of recent date, which has led neither to loss of substance nor to ulceration, to find the deep tissue of the mucous membrane, and even the muscular layer, invaded by some tubercular granulations. The latter, few in number, it is true, follow the lines of the vessels in the inter-muscular connective spaces."

When, even in the case of tubercular disease that is not of old standing, histological examination reveals such an extension of the

disease to the deeper parts, the conclusion may be drawn that it will not be sufficient for the practitioner to attack the disease by superficial alteratives, nor even by scraping, and that often complete ablation alone will succeed in removing all the portions of the uterus affected with tubercular disease.

Cornil vainly sought in this very characteristic case for the tubercle bacillus; he could not succeed in finding it, either in the giant cells and the follicles, or in the mucus which filled the glands and covered the surface of the mucous membrane. But inoculation of guinea-pigs gave rise to definite bacillary tuberculosis.

Winter,* on the other hand, found bacilli in giant cells present in strips of mucous membrane from the body of the uterus, and in others from the cervix. The case was one of a young tubercular woman upon whom Schröder had five and a half years previously performed laparotomy followed by the introduction of iodoform into the belly for tubercular peritonitis, with such success that the ascites did not re-accumulate, and that the patient had a marvellous recovery. But after a long respite tubercular disease made its appearance in the lungs and in the generative tract; the Fallopian tubes were affected, and also the uterus.

Tubercular lesions induce around them, and in the whole of the mucous membrane, a marked degree of endo-cervicitis. These inflammatory troubles affect not only the epithelial surface covering, but also the corium.

When comparing the preceding description with that of the commencement of tubercular disease of the tubes, to be described later on, according to Cornil † the greatest similarity will be observed between disease of the cervical canal and that of the tubal mucous membrane. The giant cells have the same seats at the summits of the folds and villousities, or in the connective tissue of these folds; and there are the same inflammatory phenomena, the same secretion of mucus, and the same modifications of the epithelial cells.

It is quite possible that inoculation of tubercle may occur without any erosion or solution of continuity of the cervical

* Winter. Gyn. Soc. of Berlin, June 24, 1887 (*Centr. f. Gyn.*, 1887, p. 498).

† Cornil and Terrillon. *Path. anat. and physiol. of Salpingitis and of Ovaritis* (*Arch. de physiol.*, Nov. 16, 1887, p. 550).

mucous membrane from simple contact. At any rate this occurs in the guinea-pig, as has been proved by the experiments of Cornil and Dobroklonsky,* but these facts can only be applied to the human species with the utmost reservation.

The diagnosis of tubercular ulceration of the vulva, the vagina, or the cervix uteri, can only be formed with a fair chance of correctness in cases where these lesions co-exist with pulmonary disease sufficiently advanced to put the practitioner on the track. Discovery of tubercular follicles, and especially of bacilli, in a fragment obtained by scraping or by excision will alone be pathognomonic; nevertheless a negative result is not sufficient to allow of our asserting that tubercular disease is not present. In cases of lesions primarily situated in the generative tract, there is a great probability of their being mistaken for some more common disease: thus Péan thought that the case of ulceration of the cervix, which after hysterectomy was recognised to be tubercular, was an early stage of cancer.

If the patient have advanced tubercular disease the treatment must be palliative, but in the opposite case it must be energetic. The actual cautery should be applied, and the vaginal ulcerations dressed with iodoform. Fistulous tracts must be freely excised, and there should be no hesitation in performing hysterectomy, even for a very circumscribed ulceration of the cervix, if the diagnosis be certain.

TUBERCULAR DISEASE OF THE UTERUS.

Pathological anatomy.—In the uterus tubercular disease is almost always secondary. Somewhat theoretically, three varieties of it have been described: 1st, a rare acute miliary variety, which presents no interest from a clinical point of view, and which is but an epi-phenomenon in the course of a general infection of the economy with predominance of the general symptoms; 2nd, an interstitial variety, running a slow course and essentially chronic, but which may manifest itself suddenly by a serious accident, such as rupture of the uterus, hindrance to parturition, &c., resulting from the alteration of the uterine tissue, and from the obstacle placed in the way of the physiological action of this organ by the interstitial tubercles; 3rdly, an ulcer-

* Cornil. Journ. des conaiss. méd., Aug. 30, 1883.

ating variety, which is the most common and the most important. In this latter variety the lesion at first resembles that of endometritis, upon which it often superposes its special nodules, and giant cells containing bacilli. Later, the tubercular follicles becoming confluent, the whole of the mucous lining is infiltrated by a tissue formed of small cells. It then presents complete

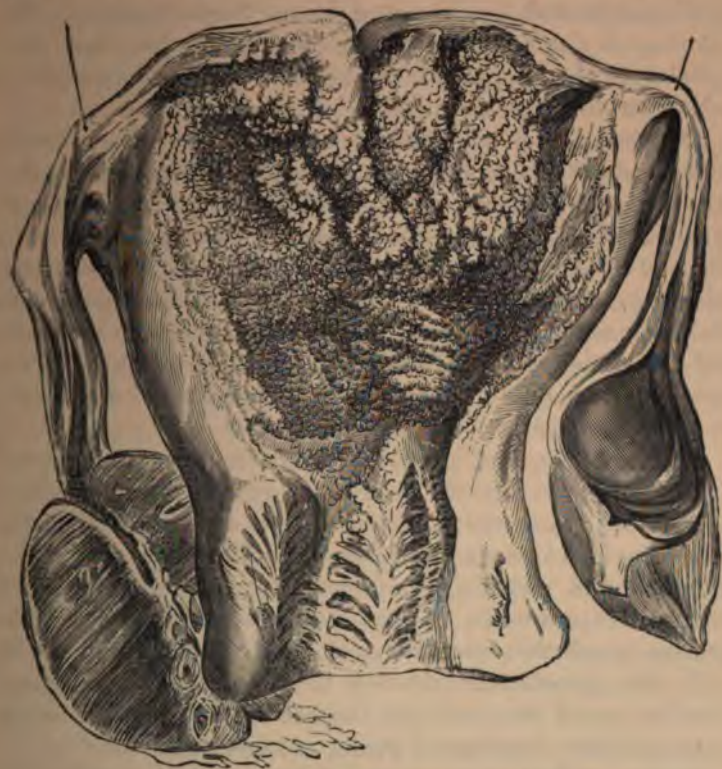


Fig. 369.—Tubercular disease of the uterus and tubes (Barnes).

The uterus is represented open; its internal surface is seen to be covered with a caseous material; the cervix is healthy.

caseous degeneration, is yellowish and opaque for a depth of from 1 to 2 millimetres; below, the muscular coat is often hypertrophied. Neither on the surface of the mucous membrane, nor on section by the naked eye, can a tubercular granulation be found which recalls the classical description of the miliary tuberculosis of the serous membranes. The cavity of the uterus is

sometimes filled with a thick curdy mass. It may possibly be transformed into a sac containing pus, from obliteration of the infra-vaginal cervix.*

As a rule, the lesion becomes clearly arrested at the upper portion of the cervix, which remains intact. The limit may be marked by an ulceration, the edges of which are as clearly cut as if a portion had been removed by an "emporte-pièce." The following is Cornil's† description of the changes that were revealed by the microscopic examination of a good example of tubercular disease of the uterus.

"Sections perpendicular to the surface of the mucous lining of the body of the uterus, after hardening in alcohol, revealed not the slightest trace of its normal structure; neither epithelium, nor glands, nor blood-vessels were recognisable. The whole of the caseous portion of the surface presented under the microscope a homogeneous layer composed of small dead cells that had undergone vitreous change, did not take on the stain, and the nuclei of which were only just tinted pink by picrocarmine. The cells were separated by fine fibrillæ interlacing in every direction.

"Beneath this dead layer there was a zone containing small living cells, and between them, here and there, a few giant cells. Then came the muscular layers, and in them a few tubercular follicles were also to be seen. In sections comprising the whole wall, including the peritoneum, there were, therefore, from within outwards, caseous infiltration that replaced the mucous membrane, some tubercular follicles in the muscular wall, and granulations situated in the peritoneal covering. Fruitless search was made for the bacillus tuberculosis in ten sections in this degenerated uterine mucous membrane."

Caseous infiltration accompanied by superficial mortification, the detached products of which constitute the curdy caseous pus that fills the uterine cavity, is the most characteristic type of this chronic tuberculosis. Cornil compares this condition to that of the same nature which is often seen in the pelvis and calyces of the kidney and in the ureters. "This resemblance," says the learned Professor, "at once strikes the eye. The condition in the body of the uterus, as in the urinary tract,

* Cornil. *Journ. des conaiss. méd.*, July 26, 1888, p. 234.

† Cornil. *Ibid.*, July 19, 1888, p. 226.

consists of a yellowish-white, opaque thickening, combined with induration of the mucous lining. The latter is quite dead, and its surface undergoes a molecular breaking up, and forms particles which, mixed with the pus, give it its grumous appearance. Under the microscope exactly the same appearance is presented; the more or less thick layer of the caseous surface is seen to be homogeneous, and to be uniformly infiltrated with small cells without any distinct traces of tubercular formation being discovered. Possibly in the deep and still living layer here and there a giant cell may be recognised. In chronic tubercular disease, with caseous infiltration of the ureters and of the pelvis, it is just as difficult to find bacilli, though after a long search one or two may be discovered. It results, from what has just been said upon the pathological anatomy of tubercular disease of the tubes and the uterus, that it is not customary to find either in the recent or in the chronic condition tubercular granulations evident to the naked eye, nor even under the microscope, which agree with the classical descriptions of tubercles. In point of fact, the granulations on serous membranes have been taken as a type, and this type is but very rarely found in the mucous lining of the generative tract."

The rarity of bacilli in tubercular disease of the uterus need cause no astonishment. It is certain that some are present, but just as in the case of the majority of local tubercular affections (tubercular disease of the testicle, lupus, &c.), they are only present in small numbers, probably because the lesions are of old date. Doyen found some present in a young woman who had died of puerperal fever, and who also presented tubercles in the uterine mucous membrane and muscle.*

The early symptoms are those of ordinary metritis with a more pronounced increase in size. Moreover, this affection, which is perhaps more common than is ordinarily supposed,† generally passes undiagnosed. The caseous nature of the secretion, and the co-existence of other lesions in the tubes and in the lungs, should lead to a search for granulations and bacilli, which alone are characteristic. Nevertheless the histological diagnosis presents great difficulties. One must not expect to find in the uterine mucous membrane

* E. Doyen (of Rheims). *Journ. des Conn. méd.*, 1888, p. 227.

† Joulin. *Répert. univ. d'obst. et de gyn.*, July, 1889, p. 319.

tubercular nodules such as are met with in the serous membranes (Cornil). On the other hand, it may be that the elementary granulation of Virchow, the only constant condition in tubercular disease, may be difficult to differentiate from a stroma already rich in, if not exclusively composed of, identical elements. Lastly, the giant cell which may be met with, according to some writers, in interstitial endometritis, is not of itself sufficient to clinch the diagnosis. Nevertheless, according to Paul Petit, the tubercular nature of an endometritis may be diagnosed with almost absolute certainty if sections of the *débris* furnished by scraping show the following characters: dead or atrophied interstitial cells, arranged either in rows or diffuse; giant cells in greater or less numbers; embryonic nodules detached from the stroma and appearing to have developed around vessels the lumen of which is, or is not, preserved; numerous glands, sinuous, dilated, lined with epithelial elements, considerably longer than normal, or having undergone epithelioid change.* For this purpose exploratory curettage should be performed, which will have the additional advantage of preventing all confusion with cancer of the body of the uterus.

Treatment.—If the condition of the lungs allow of the performance of a radical operation, a vaginal hysterectomy† should be done, instead of losing time by an incomplete treatment with the curette. If the size of the uterus be too great, and the condition of the tubes be doubtful, they must be removed by laparotomy. Supra-vaginal hysterectomy should be performed if the cervix be healthy, complete hysterectomy if it have become implicated.

* Searching for bacilli in sections takes a long time, and only too often is fruitless, however skilled the observer may be. It must be carried out on very thin, and not very large sections. Besides the innumerable modifications of Ehrlich's method, for which special treatises must be consulted, the following may be found useful: leave the section for half a minute in picro-carmin, one minute in alcohol at 70 degrees mixed with a 4 per cent. solution of hydrochloric acid, or immerse it for 24 hours in Ehrlich's methylene violet solution, then for a few seconds in a 1 per cent. solution of nitric acid; dehydrate and mount in Canada balsam. If histological examination be without results, following Cornil's advice, some of the uterine liquid should be sown in a tube of glycerine jelly, or, better still, some of this same liquid should be inoculated into the peritoneal cavity of a guinea-pig. According to Daurios, twelve days later the animal may be killed and the proof is before one. (Paul Petit. The necessity of an exact diagnosis in gynæcology, in *Nouv. Arch. d'obst. et de gyn.*, Jan. 25, 1890, p. 4.)

† Daurios (*loc. cit.*) cites a successful case by Péan (vaginal hysterectomy).

TUBERCULAR DISEASE OF THE OVARIES AND TUBES.

Pathological anatomy.—The ovaries are very rarely affected alone. A few cases cited by Klob* and Spencer Wells† are known. Lesions of the tubes are, on the other hand, most common. Terrillon‡ has seen the lesions existing simultaneously in the tube and in the ovary 3 times out of 6. Tubal lesions have also been observed in the majority of cases of tubercular endometritis, and it is they, no doubt, which are then the primary source of the infection.§ Microscopically, a condition is seen which strongly recalls that of suppurative salpingitis with or without cystic dilatation. The pyo-salpinx may be of considerable size, and even contain 2 litres of pus.|| Adhesion to and diffusion towards neighbouring parts converts it into a pelvic abscess (fig. 370).

When the lesion has existed for a little time, it reacts upon the peritoneum, and leads to the formation in it of false membranes, and of the encysted serous effusions of peri-metro-salpingitis. Fernet¶ has even described in certain cases progressive invasion of the pleura and the production of sub-acute tubercular disease of the pleura and peritoneum, starting from a primary lesion in the generative organs. This invasion occurs through the lymphatics, which Hegar once saw injected with caseous material. The lymphatic communication between the pleura and the peritoneum across the diaphragm easily explains pleural infection. The mesenteric glands often undergo degeneration.

Tubercles of the tube, developed primarily or secondarily, to the appearance of granulations in the neighbouring peritoneum, are to the naked eye recognised by the increase in size of the organ, by the semi-transparent or yellow granulations existing on its surface or in its muscular wall, and by its contents. After opening the tube longitudinally, it is recognised that it is

* Klob. *Path. Anat. der weibl. Sexualorg.*, p. 372.

† Spencer Wells. *Treatise, &c.*, p. 64.

‡ Terrillon. *Arch. de tocol.*, Aug., 1889, p. 581.

§ P. Ménétrier (*Bull. de la Soc. anat.*, July, 1889, p. 472) has published an excellent example of the condition.

|| Werth. *Ueber Genitaltuberculose* (third German Congress of Gyn., Friburg, 1889, in *Centr. f. Gyn.*, 1889, No. 29, p. 499).

¶ Fernet. *Bull. et mém. de la Soc. méd. des Hôp.*, 1884, p. 444.

dilated, that the thickened wall shows tubercular nodules, which, as a rule, are visible to the naked eye, and that it contains a more or less thick, puriform, grumous, caseous fluid, the characters of which are the same as those occurring in tubercular disease of the body of the uterus (fig. 371).

Transverse sections, cut after hardening in alcohol, show thickening of the wall and hypertrophied ramifying vegetations. In the substance and on the internal surface of these vegetations and villosities giant cells of large size are very often found



Fig. 370.—Primary tubercular disease of the tubes and the ovaries.

U, uterus seen from behind; on the posterior lip of the cervix there are two small mucous cysts; O.d, right ovary enclosing softened caseous masses which escaped when the adhesions were broken down; T, right tube, dilated and adherent, forming a portion of a tubercular pelvic abscess which is also limited by a coil of ileum, I; the left ovary and tube and the uterine mucous membrane are tubercular. There was also tubercular disease (? secondary) of the right lung (Kotschan).

containing multiple ovoid nuclei, frequently assuming the shapes of recurved, sinuous, or branched rods, and sometimes crystalline concretions (fig. 372). The free surface of the villosities and folds is almost everywhere covered by cylindrical ciliated epithelium. In some places these epithelial cells have undergone mucoid and granular degeneration, or perhaps they have desquamated and are free in the mucus together with a small quantity of pus. Staining the sections with fuchsine for the purpose of searching for bacilli tuberculosis has not always led to their discovery. Besides the giant cells and some small

tubercular follicles developed in the vegetations, follicles of greater or less size, containing giant cells, may also be found in the fibro-muscular walls of the duct.

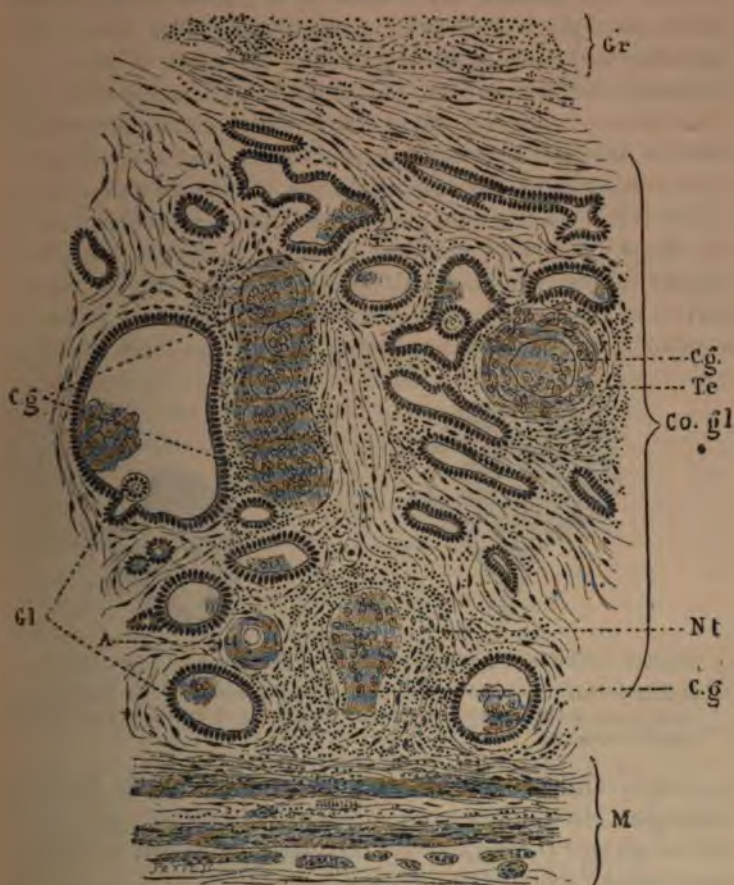


Fig. 371. Tubercular disease of the tubes. Section of the wall of a pyo-salpinx (x 150).

Co. gl., glandular layer; remnants of the mucous coat, in which are seen dilated glands. *Cg.*, giant cell in the centre of a tubercle formed by a collection of epithelioid cells; *Nt*, tubercular nodule with giant cell; *A*, arteriole cut transversely; *Gt*, sections of glands; *Gr*, internal layer of granulations; *M*, muscular layer, external (Münster and P. Ortmann).*

* H. Münster and P. Ortmann. Ein Fall von Pyo-salpinx auf tuberkulöser Grundlage (Arch. f. Gyn., 1887, vol. 29, p. 97).

In cases of older disease, in sections of the purulent sac formed by the tube, may be seen a continuous layer of embryonic tissue, without projections on the internal surface. Beneath this internal layer there is a fibrous tissue, through which are scattered perfectly defined tubercular granulations enclosing multi-nucleated giant cells. The wall of the tube is infiltrated with small cells, and presents also a few tubercular granulations. In the layer of fibrous tissue intermediate between the wall and the embryonic layer, inclusion of epithelium coming from the epithelial cells of the mucous covering of the tube is seen to have occurred. These inclusions present the shape of tubular glands. At their periphery are placed regular layers of cylindrical epithelial cells. In the central portion of the inclusion are round or ovoid pale cells, taking on a yellow colour with picro-carmin, and the nuclei of which are



Fig. 372.—Giant cells in tubercular disease of the generative organs (x 340).

Giant cells containing several nuclei, from miliary tubercles of the tubal mucous membrane; in them are seen crystalline concretions of various shapes (Münster and P. Ortmann).

no longer visible. They form a mass of dead cells that have undergone mucoid degeneration, and have become agglutinated one to another (Cornil). This condition, as is well known, has been called "coagulation-necrosis."

Tubercle bacilli have often been fruitlessly sought for in cases of undoubted tubercular salpingitis. They have, however, been found, though in small numbers, by Ortmann,* Werth, &c. The symptoms are the same as those of non-tubercular salpingitis, and in the majority of cases one is obliged to make a diagnosis of probability from exclusion of all other causes, and by taking into consideration the hereditary antecedents and any

* Ortmann. Berlin Gyn. Soc., July 13, 1888 (Centr. f. Gyn., 1888, p. 754).

possible manifestations of the disease that may be present in the lungs. The nodular arrangement of the tubal tumour, and the frequent occurrence of acute attacks of pelvic peritonitis, have been given as characteristic of this form of the disease; but there is nothing special in them, for they are to be met with in any case of pyo-salpinx. From the point of view of treatment, two distinct conditions must be distinguished according to whether pulmonary tuberculosis exists or no.

If the lungs are healthy, an endeavour should be made to extirpate completely the two tubes and ovaries by laparotomy. If the woman be phthisical, palliative treatment alone is possible. In this category will come opening of the focus through the vagina, or through the abdomen, and its careful disinfection by means of plugging with iodoform gauze.

If only slight pulmonary symptoms be present, the surgeon will act according to the considerations which would guide him in the case of any other focus of local tubercular disease.

Hegar advises surgical intervention in the case of primary tubercular disease as soon as the diagnosis has fairly been made, particularly if the process does not seem to have any tendency to become limited. In secondary tubercular disease the surgeon should interfere if, the lung condition being stationary, the lesion in the generative organs tend to advance. Tubercular peritonitis is no contra-indication; on the contrary, laparotomy has been known to have the happiest effect upon it.*

In 1886, Hegar had seen one death out of six patients upon whom operations had been performed. The late results seemed to be satisfactory. One patient, who had been operated upon three years previously, was fairly well, although she had had a relapse. Another had had a sharp attack of pleurisy four months after the operation, but recovered perfectly, and had remained in good health for a year. The other patients had been operated upon too recently for the results to be reported. Terrillon has also had several encouraging cases.

* F. Schwartz. *Wien. med. Woch.*, 1887, Nos. 13-16, p. 385 and foll.

BOOK XII.

PELVIC HÆMATOCELE, INTRA- AND EXTRA-PERITONEAL.

Definition. Division.—I. Intra-peritoneal pelvic hæmatocele.—Synonyms. Historical Survey.—*Ætiology.*—Pathogenesis; rupture of varices; disorders of ovulation; reflux through the tubes; ovarian apoplexy; pachyperitonitis; ruptured extra-uterine pregnancy.—Pathological anatomy.—Symptoms.—Progress.—Diagnosis.—Prognosis.—Treatment. Vaginal incision.—Sub-peritoneal laparotomy. Trans-peritoneal laparotomy.—II. Extra-peritoneal hæmatocele.—Synonyms.—*Ætiology.*—Pathogenesis.—Pathological anatomy.—Symptoms.—Diagnosis.—Treatment.

Definition. Division.—The outpouring of blood, “intra-pelvic hæmorrhage,” must not be confused with hæmatocele. The latter term, which has both an anatomical and clinical significance, must be reserved for encysted collections of blood. As I shall show, the effusion of blood does not take on these characters except under special pathological conditions that ensure for the lesion a long duration, and henceforth constitute of it a distinct morbid entity.*

The extravasated blood may occupy two different positions:—

1st. It may be within the peritoneal cavity, generally behind the uterus; this constitutes intra-peritoneal hæmatocele, and was the first variety the clinical history of which was clearly traced.

2nd. It may be situated beneath the peritoneum, in the broad ligaments, and even in the peri-vaginal cellular tissue; it there forms veritable thrombi, and it was under this name that old writers † designated the lesion. The name of extra-peritoneal hæmatocele ‡ is really less justified than that of hæmatoma; § but it has the sanction of usage.

* Thus effusion of blood that often occurs from the badly-tied pedicle of an ovarian cyst (Spencer Wells) does not deserve the name of a hæmatocele. This intra-peritoneal outflow of blood gives rise to certain troubles, but it becomes absorbed without forming any tumour.

† Deneux. Thrombus of the broad ligaments. Paris, 1835.

‡ Huguier. Bull. de la Soc. de chir., May, 1851, vol. 2, p. 141.

§ J. Kuhn. Ueber Blutergüsse in die breiten Mutterbänder, &c., Zurich, 1874.—A. Martin. Zeitschr. f. Geb. u. Gyn., 1882, vol. 8, p. 476.

INTRA-PERITONEAL PELVIC HÆMATOCELE.

Synonyms.—To the generic term "hæmatocele" various qualifying phrases have from time to time been applied; thus it has been called "retro-uterine" (Nélaton), "peri-uterine" (Gallard), "pelvic" (MacClintock), "peri-hysterie" (Trousseau), "uterine" (Bernutz), "circum-uterine" (de Sinéty). I prefer the term "pelvic hæmatocele," which is the most comprehensive, and includes all cases. But it must be confessed that that adopted by Nélaton*—retro-uterine hæmatocele—corresponds to the variety that is clinically by far the most common.

Historical survey.—To Nélaton is justly conceded the honour of having first included this disease in the nosological category, by means of the masterly description that he gave of it at the very outset. Nor is his honour lessened by mentioning the views of Ruysch on the passage of blood into the peritoneum; of Bourdon† on the physical signs of blood tumours already vaguely indicated by his master Récamier;‡ of Velpeau,§ who seems to have made the diagnosis, but without pronouncing upon its exact seat. Quite special reference must be made to the labours of Bernutz,|| who had sketched out with sagacity a large number of the features from which Nélaton later composed his picture. Then must be mentioned the important works of Huguier, Puech, A. Voisin, Trousseau, Laugier, Gallard, Besnier, Poncet, MacClintock, Barnes, Schröder, Olshausen, Bandl, &c., to the majority of whom I shall later have to refer.¶ From the

* Nélaton. *Gaz. des Hôp.*, 1851, pp. 573, 578, and 581;—1852, No. 12, p. 43, and No. 17, p. 66;—1853, No. 100, p. 403.—Viguès (pupil of Nélaton). *On blood tumours, &c.* Thesis, Paris, 1850.

† Bourdon. *Fluctuating tumours of the true pelvis* (*Rev. méd.*, July, Aug., Sep., 1841, vol. 3, pp. 5, 161, and 321).

‡ Récamier. *Gaz. des Hôp.*, 1831, p. 93.

§ Velpeau. *Annals of French and Foreign Surgery*, 1845, vol. 7, p. 430.

|| Bernutz. *On the accidents produced by retention of the menstrual flow* (*Arch. gén. de méd.*, June, Aug., Dec., 1848, 4th series, vol. 17, pp. 129, 433, and vol. 18, p. 403, and Feb., 1849, vol. 19, p. 186). In a note to his "*Clinique médicale*," 1860, vol. 1, p. 347, Bernutz protests against the injustice that has allowed his name too often to be forgotten.—Alph. Guérin (*Clin. lect. on the dis. of the female int. gen. org.*, 1878, p. 440) has very energetically endeavoured to repair this omission.

¶ The following are important works which will not be named later on: MacClintock. *Diseases of Women*, Dublin, 1863.—Schröder. *Berl. klin. Woch.*, 1868, Nos. 4 and 5, pp. 36 and 46.—Olshausen. *Arch. f. Gyn.*, 1870, vol. 5, p. 24.—R.

above list it is seen that in spite of conscientious endeavours to do justice to the work of persons of other nationalities, it is to French writers that we owe the largest amount of original work on this disease, almost the whole structure of which may be said to have been put together in France.

Ætiology. Pathogenesis.—Extravasation of blood into the pelvic cavity is probably of fairly frequent occurrence. There is scarcely room for doubt that the tubes during menstruation are the seat of an exudation of blood similar to that which occurs in the uterus. Many of the disorders observed at these times under the perturbing influence of a fatigue, an effort, or a chill, are probably due to the effusion of a small quantity of blood into the peritoneum, where it soon becomes absorbed.* It is known not only by numerous physiological experiments, but also by what occurs in many cases of laparotomy, how easily the blood may disappear when the peritoneum is healthy. But if the serous membrane has undergone alteration or destruction, this power of absorption immediately disappears; hence the necessity of drainage in a large number of cases of laparotomy. And no doubt this is the explanation of the origin of hæmatoceles. For if, as occurs after the rupture of a tubal foetation, the blood poured out in very large quantities takes some time to be absorbed, the clots that form play the part of foreign bodies; the peritoneum then undergoes change, puts into action its customary methods of defence, and tends to sequestrate this cause of irritation by the formation of false membranes around it.† The blood thus shut off undergoes in its adventitious sac a slow process of molecular disintegration. Sometimes even it may, under septic influences, no doubt coming by way of the Fallopian tube, undergo decomposition and become mixed with pus.

But if the blood of an intra-peritoneal salpingorrhagia is poured out slowly, and in relatively small quantities, some antecedent condition is necessary to oppose its absorption, and

Barnes. Clin. treat. on dis. of women, French trans., 1876.—Poncet. On peri-uterine hæmatocele. Thesis, Paris, 1877.—L. Bandl. Die Krankheiten der Tuben, &c. (Deutsche Chir., Stuttgart, 1886. p. 186).

* Tubal hæmorrhage as a cause of pelvic hæmatocele was first brought into notice by Paul Fernely (pupil of Nélaton), On retro-uterine hæmatocele. Thesis, Paris, 1855, p. 27.

† Puech. Ann. de Gyn., 1875, vol. 3, p. 268, and vol. 4, pp. 39 and 120.

this condition is inflammation of the pelvic serous membrane around the diseased tubes that themselves have been the source of hæmorrhage. This origin has been demonstrated by numbers of autopsies, and of examinations carried out during laparotomy. F. Imlach* reports that in fifteen cases of laparotomy for hæmatocele, he found both tubes distended with black, thick blood exactly similar to that which was effused into the abdomen. Now it is impossible to consider tubal foetation when the tubal lesion is bilateral, and reflux of the blood in the abdomen into the tubes is also an hypothesis that cannot be seriously upheld. E. Sinclair Stevenson,† from the examination of a specimen where the appendages were removed, further believes that the narrowing of the inflamed tube may cause hæmorrhage into the peritoneum during menstruation.

Inflammation of the tubes prepares in advance for the encysting of the blood, by leading to the formation around the fimbriated extremity of false membranes, traces of which are to be found in the partition walls of the sac. Slight attacks of pelvic peritonitis with constant relapses are seen at the commencement of nearly all cases.

The usual origin of large extravasations of blood is no doubt the early rupture of a tubal extra-uterine gestation. I refer the reader to the chapter upon the condition in question for fuller details. I only point out that this rupture often takes place in several stages by successive attacks. With regard to hæmatoceles having an insidious and progressive development, they are probably the result of true intra-peritoneal salpingorrhagia and pre-suppose an antecedent salpingitis.

This question of pathogenesis has been and still is much contested. I will just pass in review the theories that have been successively advanced. Each has excluded the others, and yet it is very probable that each corresponds to a certain series of cases. One factor alone is constant, and that is the impermeability of the pelvic peritoneum, primary or secondary, in consequence of an antecedent peri-salpingitis, or of the very largeness of the effusion which brings about changes in the serous membrane by its prolonged contact and by a kind of permanent imbibition.

Rupture of varices.—The rupture of varices of the utero-

* Imlach. B.M.J., 1886, vol. 1, p. 339.

† Stevenson. Edinb. Med. Journ., March, 1888, vol. 33, part 2, p. 809.

ovarian plexus of veins, noticed in 1834 by Ollivier (of Angers), has been especially brought into notice by Professor Richet. The hæmatocele that occurs during the course of a tubal foetation may arise not from rupture of the ovum but from that of a dilated vein in the broad ligament. I have seen a case of this kind. The excess of pressure that follows upon ligation of the tubo-ovarian vessels after salpingotomy sometimes occasions an intra-ligamentous rupture of the veins under the influence of moderate efforts, or simply at the congestive period corresponding to menstruation. Winckel has shown that phleboliths contained in the varicose veins may ulcerate their walls on the peritoneal side, as also towards the interior of the broad ligaments.*

Disorders of ovulation.—This theory refers the production of a hæmatocele to an ill-defined disorder of ovulation; the tube not finding itself exactly applied to the ovary at the moment of ovulation, blood becomes extravasated into the peritoneum.† Gallard‡ believed that in every case of hæmatocele there was extra-uterine ovulation whether the ovum were fecundated or not.

Reflux through the tubes.—Most of the older writers denied that the tubes themselves took any part in supplying the catamenial flow, but they admitted the possibility of a reflux of blood coming from the uterus at the time of menstruation and under any perturbing influence whatsoever. Bernutz, who admitted the existence of hæmatocele symptomatic of catamenial excretion, supports himself upon the authority of Ruysch and Haller. Alph. Guérin§ advances the view that the menstrual disorder occurring in membranous dysmenorrhœa is of a nature to lead to effusion of blood into the peritoneal cavity. "The mucous membrane of the uterus," he says, "which swells up during menstruation, fills the whole of the uterine cavity. When the menstrual crisis is about to end in the exfoliation and casting off of this membrane the turgescence is no hindrance to the hæmorrhage, but only puts an obstacle in the way

* Winckel. *Lehrbuch der Frauenkr.*, 2nd edit., 1892, p. 719.

† Lenoir. *Bull. de la Soc. de chir.*, June, 1851, vol. 2, p. 155.—Nélaton, *Gaz. des Hôp.*, Dec. 11-13, 1851, p. 573, and Feb., 1852, p. 66.—S. Laugier. *Comptes rendus de l'acad. des Sciences*, Feb., 1855, vol. 40, p. 455.

‡ Gallard. *Bull. de la Soc. Anat.*, April, 1858, p. 157, and *Gaz. hebdom.*, June 25, 1858, p. 160.

§ A. Guérin. *Clin. lect. on the dis. of the female gen. org.*, p. 439 (15th lecture).

of its flow through the vagina. Now, when the mucous membrane becomes detached from the subjacent layer it forms a plug which, for a certain time, hermetically closes the cervix uteri while the orifices of the tubes are open." Uterine contractions would then suffice to expel into the peritoneal cavity through the ostium abdominale all the blood contained in the womb. Guérin adduces in support of this view a case of membranous dysmenorrhœa complicated by hæmatocele, and says that he has seen many other examples of it. These cases are quite natural if one remembers that membranous dysmenorrhœa is, in sum, due to a process of acute endometritis, which may coincide with a hæmorrhagic salpingitis.

Ovarian apoplexy.—Microcystic degeneration, the result of chronic ovaritis, follicular cysts, and cysts of the corpora lutea, are sometimes the seat of apoplexies, rupture of which may give rise to an outpouring of blood into the peritoneum.*

Pachyperitonitis.—It is known that meningeal hæmorrhages are due to the rupture of the dilated and friable vessels in the false membranes of an antecedent pachymeningitis. This interesting fact of general pathology was first brought to light by Dolbeau,† and later by Virchow,‡ who generally passes for its sole originator. May not a similar process explain the formation of hæmatoceles? It was natural to think of it in the presence of false membranes dependent upon pelvic peritonitis. Ferber,§ Besnier,|| and Bernutz¶ have developed this theory, but most certainly it has been carried too far.

Ruptured extra-uterine pregnancy.—Huguier has given to cases of this description the name of *pseudo-hæmatoceles*. If rupture be accompanied by considerable hæmorrhage and lead to sudden death, one cannot legitimately give it the name of hæmatocele. But why refuse it if the extravasated blood be circumscribed and become encysted? It is even probable that such cases are

* E. Boeckel. Gaz. méd de Strasbourg, 1861, p. 79.—Rollin. Ann. de Gyn., 1889, vol. 32, p. 354.

† Dolbeau. Gaz. des Hôp., 1860, No. 35, p. 138 (supplement).

‡ Virchow. Die krankh. Geschwülste, 1863, vol. 1, p. 150.

§ Ferber. Schmidt's Jahrb., 1864, vol. 123, p. 223; vol. 125, p. 321, and 1870, vol. 145, p. 39.

|| Besnier. On hæmorrhagic pachy-pelvi-peritonitis (Ann. de Gyn., 1877, vol. 7, p. 401, and vol. 8, pp. 110 and 297).

¶ Bernutz. On hæmatocele symptomatic of hæmorrhagic pachi-pelvi-peritonitis (Arch. de tocol., 1880, pp. 129 and 205).

more frequent than is supposed,* and that there is, if one may so speak, such a thing as intra-peritoneal abortion, just as there is miscarriage per vias naturales, which is so often unrecognised when it occurs during the first weeks after impregnation.

To the preceding pathogenic conditions it must be added that all general diseases which lead to hæmorrhages may be causes of extravasation of blood into the peritoneum. But it would be an extreme misuse of the term "hæmatocele," to designate under that name the effusions of blood found in the true pelvis in cases of scorbutus, acute yellow atrophy of the liver, phosphorus poisoning, &c.

I must not, however, forget to mention, while dealing with the ætiology, the influence of menstruation as a determining cause. It is generally at a menstrual period that hæmatocele makes its appearance, and that is accounted for by the congested condition of the pelvic organs at those times. All causes that then tend to exaggerate the normal erythism, such as fatigue, jolting, coitus, &c., act in the same direction.

To sum up, without refusing to the numerous causes that have been enumerated some part in the ætiology of intra-peritoneal pelvic hæmatocele, we may assert that by far the greater number of cases originate in some tubal lesion, hæmorrhagic salpingitis, with peri-salpingitis in the case of hæmatoceles whose course is progressive, and size moderate; foetal cyst in the case of very abundant hæmatoceles appearing suddenly, or to use Barnes's expression, "cataclysmic."

Pathological anatomy.—The tumour as a rule is situated in Douglas' pouch, the deepest portion of the pelvis, whence Nélaton's choice of the name *retro-uterine* hæmatocele. However, it may happen that this cul-de-sac has been obliterated by some previous plastic inflammation; then the blood collects, under the influence of gravity, in front, between the bladder and the uterus, and an ante-uterine hæmatocele is formed. G. Braun† and Schröder‡ have cited examples of this condition; other cases, forming the majority of those reported, refer to extra-peritoneal ante-uterine hæmatocele.

* Veit. Deut. Zeitschr. f. prakt. Med., 1877, No. 84, p. 877.—A. Doran, B.M.J. Oct. 10, 1891.

† G. Braun. Wien. med. Woch., 1872, No. 22, p. 545, and No. 28, p. 577.

‡ Schröder. Dis. of the female gener. org. French trans., p. 492.

At first the blood is fluid and forms a kind of pool, which can alter its position, for it is rare for pre-existing false membranes from the outset to form a sac. Very soon it becomes encysted, and then the sac is separated off from all parts of the mass of intestines. It may be very difficult to distinguish the newly-formed membranous vault from a raising of the peritoneum, and to differentiate an intra-peritoneal from an extra-peritoneal hæmatocele. However, in the latter case the tumour is situated more on one side, for it is especially the broad ligament between the layers of which the blood is poured out.

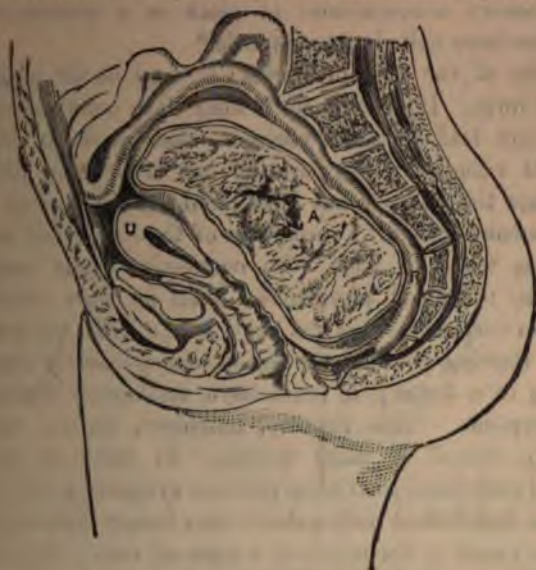


Fig. 373.—Retro-uterine hæmatocele.

U, uterus; R, rectum; A, hæmatocele encysted by false membranes.

The sac is adherent in front to the posterior wall of the uterus, which is pushed towards the symphysis; it is blackish in colour. The ovaries and tubes are more or less unrecognisable, and are mixed up with the walls of the tumour. Sometimes the tubes are full of blood and are ruptured;* but one only is in this condition if the case depend upon rupture of a foetal cyst. The intestines, matted together, may be adherent to the sac. When it is opened a large area is found in which the blood is coagulated,

* Guérin. *Loc. cit.*, p. 459.

semi-liquid, or syrupy, according to the standing of the disease. The colour is black, like that of black-currant jelly; towards the surface decolourised and whitish layers of fibrin are sometimes to be seen. The walls of the sac are thick at certain places, very thin at others where rupture seems imminent. The rectum is compressed and deviates from its normal position (fig. 373).

With hæmatocele must not be confounded hæmorrhage occurring into an ovarian cyst, the wall of which presents a characteristic structure. It is also by a misuse of terms that the temporary accumulation of clots in a punctured pelvic abscess has been called a hæmatocele.*

The size of the tumour varies; it may be as large as the uterus at term. If it exist for a long time compression of the ureters may lead to renal changes, such as occur with other abdominal tumours. Suppuration has often been noted. At other times the autopsy has discovered the signs of an attempt at spontaneous cure, viz., absorption of the liquid and retraction of the sac, which is filled with connective-tissue new growth coloured by the blood pigment.† Even in cases where one is justified in suspecting that the rupture of a tubal pregnancy has been the starting-point of the lesion, one generally cannot find any trace of a foetus; it must have undergone disintegration and absorption. This rupture, moreover, occurs very early, about the second or third month. In cases in which the autopsy is performed soon after the first symptoms, and when the foetus has succumbed only a short time before their appearance, it may be found in the midst of a mass of clot. But often the woman will have died so rapidly that there has been no time for the formation of a cyst-wall, and the case will be simply one of internal hæmorrhage. Nevertheless a first limited hæmorrhage may occur and form a hæmatocele, while a second abundant hæmorrhage carries off the patient. Then the phenomena develop with sufficient rapidity for the foetus to be found at the autopsy.‡ If the foetus leave no permanent traces, the opposite is the case with the chorionic villi, traces of which will be found by careful examination, and will very often demonstrate the

* Playfair, cited by Barnes. Clin. Treat., &c., p. 815.

† R. Barnes (*loc. cit.*, p. 500, fig. 100) has represented a fine specimen from the museum of Guy's Hospital.

‡ Matthews Duncan. Edinb. Med. Journ., 1884; case cited by Barnes, *loc. cit.*, p. 519.

origin of the lesion. Lawson Tait has thus proved conclusively that pelvic hæmatocele is the ordinary mode of termination of extra-uterine pregnancy.*

Symptoms.—The appearance of a hæmatocele is almost always preceded by morbid symptoms on the side of the uterine appendages, pain, menstrual troubles, gastric reflexes. They are an indication of the salpingitis or of the extra-uterine fœtation. It is very rare for the actual extravasation of blood to be unmarked by acute symptoms, though the intensity of these is very

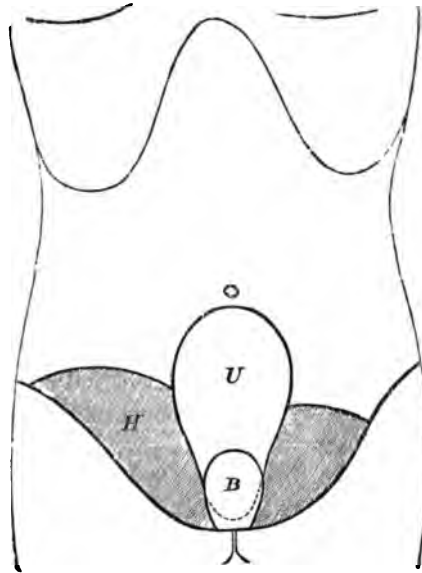


Fig. 374.—Retro-uterine hæmatocele.
U, uterus; B, bladder; H, hæmatocele.

variable. They may be fulminating, or to use Barnes's expression, "cataclysmic" in character, with faintness, syncope, coldness, imminence of death. If this internal hæmorrhage be survived, the symptoms of an abdominal tumour become more and more definite, while the general symptoms gradually disappear. In less severe cases the onset is simply marked by local pain and a feeling of weakness combined with increase in size of the abdomen.

Lastly, intra-peritoneal oozing of blood may occur in an insidious and almost imperceptible manner.

* L. Tait. Edinb. Med. Journ., July, 1889, p. 108.

The days following the first appearance of the morbid phenomena are occupied by attacks of plastic peritonitis, which circumscribe the blood, and occasion nausea, tympanites, pain, and fever.

The objective signs revealed by digital examination and bimanual palpation are those of a fluctuating tumour filling up Douglas' pouch, which pushes the uterus upwards and renders the cervix difficult to reach. If one succeed in reaching it, it is found flattened against the pubes. The tumour does not long remain fluctuating, it soon acquires a consistency recalling that of snow; but this consistency varies greatly; at some points it is quite hard, at others easily depressible. Bimanual examination allows of the perception of the body of the uterus, which appears to be enclosed in the midst of the tumour, and this often completely fills the true pelvis, or even exceeds its limits (fig. 374). Rectal examination is rendered extremely difficult by reason of the approximation of the walls of the bowel. This compression may give rise to signs of internal strangulation; that of the bladder to retention of urine; that of the sacral plexus to acute neuralgic pain in the lower limbs.

The general condition of the patient is variable; even in the absence of suppuration fever is common, and occurs in irregular outbursts; it is caused by the peritoneal reaction induced by the formation of the false membranes.

The progress of the disease is essentially chronic, but it is common to see successive attacks as if fresh quantities of blood were poured out into the initial seat. These repetitions sometimes make their appearance a few days after the first onset of symptoms, or later at the following menstrual periods, no doubt under the influence of the catamenial congestion. In cases where the original cause of the intra-peritoneal hæmorrhage was the rupture of a foetal cyst, the return of the symptoms is particularly formidable and may very rapidly cause death, even when all danger has seemed to have been passed. With the exception of these exceptionally grave cases, the disease has a natural tendency to recover, by progressive absorption or by spontaneous evacuation. But the latter mode of recovery, which can only take place after suppuration of the hæmatocoele, leads to very serious symptoms.

In happy cases, the patient remains for several months unable

to walk, and exposed to repeated slight attacks of peritonitis, during which the tumour undergoes alternating differences in size, and ends by undergoing progressive diminution. It may, after it has disappeared, leave behind some induration or simply leave the uterus immovable and deviated from its normal position.

Suppurative inflammation is announced by an aggravation of the constitutional disturbance, by the appearance of irregular rigors, and by sweats. At the same time the tumour increases in size, and its induration diminishes. Perforation into the abdominal cavity is very rare. The peritonitis that supervenes in cases of suppuration of the cyst is rather due to direct extension of the inflammation across the cyst-wall.

Evacuation into the rectum is commonest. Preceded by symptoms of proctitis it is ushered in by the sudden appearance of a blackish and foetid diarrhoea that brings with it immense relief and disappearance of the tumour. The evacuation may be complete and recovery may occur, but death also may occur from exhaustion, or from the infection caused by entrance of faecal matters into the cavity. Perforation into the vagina is rare, and into the bladder* is quite exceptional.

Diagnosis.—The clinical picture presented by hæmatocele is often so characteristic that no doubt is possible. The sudden appearance of a retro-uterine tumour, together with the symptoms of internal hæmorrhage, are really pathognomonic. Rupture of a pyo-salpinx or of a pelvic abscess only gives rise to acute pain to the signs of peritoneal reaction, generally here much more intense, and not to a tumour which appears at the very commencement of hæmatocele. This must not be confounded with a retroflexed gravid uterus. One of the best modes of avoiding the mistake is to make a careful endeavour to isolate the uterus, which, in the case of hæmatocele, is situated in the middle of the swelling. The administration of chloroform will greatly aid this examination.

Ovarian cysts† and fibroids of the uterus incarcerated in the true pelvis have nothing in common with hæmatocele but their objective symptoms. Their mode of appearance and their course are essentially different. The same may be said of extra-uterine

* Ott. Gaz. des Hôp., 1861, p. 53.

† Aesch (Centr. f. Gyn., 1887, p. 427) reports a mistake of this kind. The cyst that the surgeon punctured through the vagina, thinking that it was a hæmatocele, was afterwards successfully removed.

pregnancy, which, moreover, is rarely situated behind the uterus. Hypertrophy of this organ and persistent amenorrhœa would be presumptive evidence in favour of ectopic gestation; as I have said, it is often only the initial phase and the starting-point of ulterior hæmorrhage.

At a later period the inflammatory nodules of peri-metro-salpingitis can only be distinguished by consideration of the history.

The diagnosis of the origin of the hæmorrhage can only be surmised. When the hæmorrhage occurs suddenly, or is "dramatic" (Bernutz), it usually depends upon rupture of a foetal cyst. If the hæmatocele has had an insidious onset and has run a slow course, the blood has probably been poured out progressively by a hæmorrhagic salpingitis. If the woman be greatly troubled with varicose veins, rupture of a vein in the broad ligament may be thought of.

Prognosis.—The affection is serious: it may in rare cases bring about death very rapidly; it exposes the patient to great risks before recovery is complete. Lastly, recovery is scarcely ever complete; the plastic material around the uterus is a frequent cause of discomfort, and almost with certainty brings sterility along with it.

Treatment.—Active interference is only justified when accidents arise that threaten the patient's life. At first, if the symptoms are moderate, ice should be applied to the hypogastrium to combat at the same time the hæmorrhage and the peritonitis. The patient should be kept at absolute rest; the bladder should be emptied regularly by a catheter and the bowel by enemata. Care must be taken not to exhibit too much opium for the relief of pain, for fear of increasing the constipation. Particular care must be given to ensuring asepsis of the vagina in order to avoid infection of the hæmatocele by the genital canal.

From a historical point of view surgical intervention may be divided into three periods: from the time of Récamier to that of Nélaton it was held always necessary to puncture or incise these collections of blood, spontaneous absorption of which seemed impossible; next, the large number of unsuccessful cases led to the renunciation of this method, and it was then recognised that even large hæmatoceles are capable of undergoing spontaneous recovery: the expectant treatment was therefore made

the rule; at the present day the custom is not to interfere when the disease follows a regular course that will slowly bring about absorption. But, thanks to the progress of antiseptics, there need be no fear about intervention directly the life of the patient is threatened by symptoms of either compression or inflammation. Rapid evacuation of the cyst should then immediately be effected.

Incision is greatly preferable to puncture. The latter does not provide for exit of the solid portions, lends itself ill to the cleansing of the sac, and may transform it into a septic cavity. The site of incision will be determined by the point at which the tumour projects the most. If it definitely bulges into the posterior cul-de-sac, it should be attacked through the vagina. The cervix uteri is drawn forward, the left index-finger is placed in the rectum, the largest possible amount of room is afforded by the use of retractors, and an incision is made in the long axis of the tumour, taking care not to carry it too far laterally for fear of wounding the ureters. The finger in the rectum serves as a guide to prevent wounding the intestine. As soon as the focus is reached, the incision is enlarged if necessary with strong scissors, and issue of the syrupy and clotted material is induced by means of a very weak antiseptic injection. In one case I was obliged to go in search of the clots, which formed a coherent mass, with a soup-spoon. It will be well to proceed with the greatest care and not endeavour to thoroughly clear out the cyst at the first operation, for fear of compromising the adhesions that limit it. Immediately afterwards the cyst should be loosely packed with strips of weak iodoform gauze, which should be left *in situ* for 48 hours; this course has the advantage of guarding against secondary hæmorrhage and of completing the disinfection.* On removing these tampons, antiseptic irrigation should again be resorted to, and then a large drainage tube with cross-piece should be placed in the sac; around the drainage tube iodoform gauze should again be packed, but in the vagina alone for fear of absorption. The free extremity of the tube should be enclosed in some antiseptic dressing; it will be useful for the purpose of giving injections into the interior of the sac once or twice a day, if that course be necessary. When the sac is of large size, each antiseptic injection should be followed by a neutral injection of boiled water; unless this

* P. Mundé. New York Med. Press, Dec., 1885, p. 10.

precaution be taken, there will be a danger of intoxication. The prognosis of this operation has completely changed since the introduction of antiseptics. Nélaton, who supported it for a long time, ended by giving it up* on account of the frequency with which septicæmia followed it. Guesserow has given the statistics of his own cases, eight in number, out of which six recovered after periods of from 6 to 21 days; he only advocates surgical intervention in serious cases. Routier† has published three cases successfully treated by a vaginal incision, which he now prefers to laparotomy.

Incision through the vagina calls for very rigorous antiseptics, and sometimes presents real dangers. This is when the tumour is at some distance from the posterior cul-de-sac, which may be obliterated, and when its greatest prominence is towards the abdomen. Lastly, if the cavity is extremely large, the vaginal incision, which of necessity must be a limited one, will be too small to assure evacuation of the contents, and to allow of thorough antiseptics. Under these conditions I once successfully performed sub-peritoneal laparotomy.‡ This operation (cf. the chapter on the Treatment of Pelvic Abscess) consists essentially, the reader will remember, in making a long incision parallel to Poupert's ligament, separating the peritoneum until the seat of the disease is found, and penetrating into this latter on the side adherent to the pelvis, thus avoiding implication of the peritoneal cavity. After having carefully emptied the blood-cyst the cavity is to be explored by introducing the fingers into its deepest part and ascertaining, in conjunction with vaginal examination, the most favourable spot for the passage of a drainage tube across the posterior cul-de-sac. If the sac be at all large, drainage in this direction by means of a tube with cross-piece should be supplemented by drainage through the abdominal incision by means of two large tubes fixed like the barrels of a double-barrelled gun, or of several tubes arranged like those of Pandean pipes, or of strips of iodoform gauze. For the first two or three days at least it will be well to loosely plug the interior of the sac with weak iodoform

* Trélat. Bull. et Mém. de la Soc. de chir., 1886, p. 812.

† Routier. Ann. de Gyn., Jan., 1890, vol. 33, p. 8.

‡ S. Pozzi. On sub-peritoneal laparotomy, &c. (Bull. et Mém. de la Soc. de chir., April 14, 1886).—Jeannel (Rév. méd. de Toulouse, March 1, 1887) imitated my plan of action in a case of suppurating hæmatocele with the greatest success.

gauze which presents the triple advantage of preventing secondary hæmorrhage *a vacuo*, of completing the antiseptic treatment, and of assisting the passive action of the drainage tubes by the much more active capillary drainage.*

If when attempting to perform sub-peritoneal laparotomy the surgeon cannot succeed in stripping off the serous membrane up to the point at which the sac is adherent to it, the following course should be adopted: freely incise the peritoneum at the bottom of the wound, and plug it against the sac, which is to be left untouched, in such a way as to lead to the formation between it and the incision of a kind of track closed by adhesions. After 24 hours remove the tampons and open the sac.

Laparotomy properly so called has yielded very good results.† If possible the sac should be fixed to the abdominal wall by "marsupialisation," emptied, plugged, and drained. But this theoretical manœuvre is rarely practicable, on account of the absence of a well-formed and resistant cyst wall; the latter generally has no individuality, and is simply formed by adhesion of neighbouring parts. The surgeon may then be forced to content himself with antiseptic flushing of the cavity, and leave it purely and simply in the abdomen. In such a case it would be wise to plug with iodoform gauze and provide capillary drainage.

Transperitoneal laparotomy seems to me to be but rarely called for on account of the grave danger of septic peritonitis to which it exposes the patient.‡

* This mode of drainage is far preferable to the gum-elastic or glass tube provided above with an arrangement like the rose of a watering-pot and below with a cock, such as is recommended and figured by Zweifel. Zur Behandlung der Blutergüsse hinter der Gebärmutter (Arch. f. Gyn., 1883, p. 185).

† Prengrueber. Semaine méd., Jan. 6, 1886, p. 1.—This case was one of a patient who had severe symptoms of intestinal obstruction occasioned by the pressure excited by a tumour, "abscess, cyst, or hæmatocele," the nature of which could not be determined; laparotomy was at first exploratory, and it must be recognised that under the condition of doubt no other operation could be undertaken.—Routier (Abelle méd., 1888, No. 44, p. 347) operated by laparotomy upon three cases of hæmatocele, of which two were suppurative. The sac was stitched to the abdominal walls and drained. All cases recovered, but in one the bladder was wounded and a fistula resulted.

‡ L. Tait (The pathol. and treatment of diseases of the ovaries, 1883) alone has proposed always to perform laparotomy at the very outset.—Gusserow (*loc. cit.*) pronounces himself formally against laparotomy.—Schröder (Die Krankh. der weibl. Geschlechtsorgane, p. 472) and A. Martin (Path. und Ther. der Frauenkr., p. 357) also speak very guardedly on this question.—In America also there is a feeling against

A very particular, and happily a somewhat rare case in which active interference is obligatory, is that in which the onset of the symptoms is due to the interruption of an undoubted tubal pregnancy; in such cases, as is well known, the hæmorrhage occurs in successive attacks; is it advisable to wait for the catastrophe, or would it not be better to prevent it by immediate laparotomy? Martin* cites a case of this kind, in which he regretted that he had abstained from operating; the woman succumbed to a fresh attack of internal hæmorrhage four days after the consultation. In such cases bold interference seems to me justifiable and called for at the outset by the special characteristics of the clinical variety.

EXTRA-PERITONEAL HÆMATOCELE.

Extravasation of blood into the connective tissue of the true pelvis has also been called "extra-peritoneal hæmatoma," "thrombus of the broad ligaments," "pseudo-hæmatocele." Denied by some writers in the absence of the puerperal state, in which thrombus of the vagina and of the vulva may also occur, the existence of this condition is at the present day definitely admitted.†

Ætiology.—It may occur under the influence of pregnancy, which, as is well known, leads to considerable dilatation of the whole pelvic venous system, and in particular of the utero-ovarian plexus. But utero-ovarian varicocele may exist in a woman and give rise to a sub-serous rupture even in the absence of pregnancy, by laceration or by ulceration of veins containing phleboliths. It is generally under the influence of fatigue or of venereal excesses during menstruation that it occurs, and in multiparæ, in whom the veins are more dilated than in women who have never borne any children.

this excessive boldness.—Lee, Morill, and Maclean strongly pronounced themselves against it before the Obstet. Soc. of New York, Oct. 2, 1888 (*Amer. Journ. of Obstet.*, 1888, vol. 21, p. 1175).—Routier (*Annal. de Gyn.*, Jan., 1890, p. 8) has returned to the vaginal incision.

* A. Martin. *Clinical treatise on the diseases of women*, French trans., 1886, p. 531.

† Baumgärtner. *Deut. med. Woch.*, 1882, No. 86, p. 487.—A. Martin. *Zeitschr. f. Geb. u. Gyn.*, 1882, vol. 8, p. 476.—Balleray. *Med. News*, Philadelphia, 1888, vol. 42, p. 358.—Grünfeld. *Gaz. hebdom. des Soc. méd. de Montpellier*, 1868, pp. 431 and 505.

According to Byrne* thrombus of the broad ligaments is much more common than is supposed, and often gives rise to pelvic abscess or cellulitis. Skene Keith† has remarked that ephemeral extra-peritoneal hæmatocele often arises after salpingotomy by reason of a congestive condition occurring at the first menstrual period.‡ Beigel§ believes that extra-peritoneal hæmatocele constitutes a considerable portion of the cases referred to the usual variety.

Pathological anatomy.—The blood may form a circumscribed tumour between the two layers of the broad ligament. As they do not form a closed cavity, but communicate with the pelvic cellular tissue, the effusion of blood, if it be very abundant, passes beyond their limits; it then locates itself on the sides of the vagina and of the rectum. The tumour is, as a rule, of moderate size, and varies from that of the foetal to that of the adult head. It is definitely lateral, and if it be present on both sides, one of them is always incomparably larger than the other. The two foci, moreover, may end in becoming united. The collection is sometimes even situated in front of the uterus.|| A. Martin,¶ who has had the possibility of studying the pathological anatomy of this lesion in several operations, has always found a cyst with unequal surface, over which were deep diverticula into the cellular tissue traversed by connective bands and broken blood-vessels. The contents is composed of blood and clot more or less altered; there is sometimes an admixture of pus; it may, from rupture of the broad ligament, communicate with an intra-peritoneal effusion.

Symptoms.—This condition occurs in women who are apparently quite well. Acute pain in the hypogastrium with a tendency to syncope marks the onset. Various successive

* Byrne. *Obstet. Soc. of New York*, Oct. 2, 1888 (*Ann. de Gyn.*, Jan., 1889, vol. 31, p. 45).

† Skene Keith. *Edinb. Med. Journ.*, 1887, p. 811.

‡ I have seen four examples of this. In one absorption occurred spontaneously; in two others the collection of blood was evacuated by the rectum; lastly, in one patient a hard tumour persisted for a very long time in consequence of the incomplete absorption of the extravasated blood, and gave rise, by compression, to excessively painful symptoms of neuritis for several months.

§ Beigel. *Arch. f. Gyn.*, 1877, vol. 11, p. 377.

|| Braun. *Wien. med. Woch.*, 1872, p. 22.—Fauny, Berlin. *Amer. Journ. of Obstet.*, 1889, p. 498.

¶ A. Martin. *Loc. cit.*, and *Clin. treatise on the dis. of women*, French trans., 1889, p. 497.

attacks may be observed. Symptoms of intense anæmia and disorders, due to compression of the bladder and of the rectum, make their appearance, along with swelling and tenderness of the abdomen. By digital and bimanual examination the tumour is felt to be situated in the broad ligament and not in Douglas' pouch; it is soft and doughy; the uterus is found on its internal side, is more or less pushed on one side, but may be isolated in every direction. With regard to the other symptoms and the course of the disease, they are similar to those traced out for intra-peritoneal hæmatocele.

It is to cases of extra-peritoneal hæmatocele that must probably be referred that very exceptional symptom, ecchymotic colouration of the vagina. Ecchymosis of the abdominal wall has even been seen, though very rarely.*

The differential diagnosis from intra-peritoneal hæmatocele cannot always be made. The chief elements for consideration are the ætiology, the purely lateral situation, and the connections of the tumour.

Treatment.—The expectant method is here also the general rule. If the severity of the symptoms call for surgical interference, vaginal incision can scarcely be thought of, on account of the danger of wounding the large vessels or the ureter. Sub-peritoneal laparotomy seems to me to be the operation of election. Martin recommends trans-peritoneal laparotomy, cleansing of the cavity, and stitching of the sac over a drainage tube with cross-piece, the lower end of which is made to come out into the vagina. He has thus obtained nine successful cases out of ten operations.

* Weisinger (Med. Age, 1886, No. 21), reports a case of abdominal ecchymosis, and says that another similar case had been observed by J. Bartlett, and communicated to the Gynæcological Society of Chicago.

BOOK XIII.

ON EXTRA-UTERINE FETATION.

Definition.—**Pathogenesis.** **Ætiology.**—**Division.**—**Pathological anatomy.** Tubal foetation. Interstitial foetation. Tubo-abdominal and tubo-ovarian foetation. Ovarian foetation. Abdominal foetation. Foetation in a rudimentary horn. Condition of the uterus in extra-uterine foetation. Anatomical modifications supervening upon the death of the fœtus. Lithopædion.—**Symptoms.**—**Diagnosis.** 1. Of extra-uterine foetation before the fifth month from: normal pregnancy; abortion; fibroid; hydro-, hæmato-, and pyo-salpinx; retroversion of the gravid uterus; foetation in a rudimentary horn. 2. Of extra-uterine foetation after the fifth month from normal pregnancy. Diagnosis of the variety. Diagnosis between false labour and rupture. Diagnosis of a dead ovum from: uterine fibroid; pelvic hæmatocele; dermoid cyst of the ovary; cancer of the peritoneum. Diagnosis of fistulæ. Diagnosis of complications.—**Prognosis.**—**Treatment.** Morphia injections. Electricity. Extraction of the fœtus. 1. Extra-uterine foetation before the fifth month without rupture. 2. Extra-uterine foetation before the fifth month, after rupture. 3. Extra-uterine foetation after the fifth month, child living. 4. Extra-uterine foetation after the fifth month, child recently dead. 5. Extra-uterine foetation after the fifth month, child long dead. 6. Suppurating old foetal cyst. 7. Foetation in a rudimentary horn.—**Method of performing laparotomy.** Preservation of the sac (marsupialisation). Complete removal of the sac.—**Method of extracting the fœtus by elytrotomy.**—**Extraction of the foetal debris through a dilated urethra and through the vagina.**—**Extraction of the fœtus through the perineum and through the pelvis.**

EXTRA-UTERINE or ectopic (Barnes) foetation is the development of a fœcundated ovum outside of the normal uterine cavity.

Pathogenesis. **Ætiology.**—All circumstances that can oppose the application of the Fallopian tube to the ovary, at the moment of ovulation, are likely to allow of the occurrence of impregnation in an abnormal situation. It is known, in point of fact, that spermatozoa may penetrate into the peritoneal cavity and live there; and also that the ovum may also fall into it and travel over a large distance without its vitality being compromised.* Adhesions of the ovary secondary to attacks of local peritonitis, which are common with salpingitis, disappearance of the ciliated epithelium, or the presence of a small intra-tubal polypus†

* Leopold. Die Ueberwanderung der Eier (Arch. f. Gyn., 1880, vol. 16, p. 24).

† Th. Wyder (Arch. f. Gyn., 1886, vol. 28, p. 362) found on one occasion a small polypus in the tube, and demonstrated the absence of vibratile epithelium.

obstructing the normal migration of the ovule, are the most common causes. It has also been ascribed to some strong emotion at the time of conception.

The affection is rare: out of sixty thousand women examined during seven years in the practice of Carl Braun and of Späth at Vienna, only five cases of it were found.* But this figure seems to be too low. Fasola † has seen five cases out of 1,565 pregnancies in women who had already borne children, but had remained sterile for a long time.

Recurrence of extra-uterine foetation in the same woman has been noted.‡



Fig. 375.—Tubal foetation at 2½ months; the sac is intact (Bouilly).

Division.—The anatomical divisions and sub-divisions have been greatly multiplied, but without any advantage. The vast majority of foetal cysts occur in the tube, and are tubal foetations. According as the ovum develops exclusively in this duct, or in part in the uterine walls or in the abdominal cavity, we have the varieties of tubal foetation properly so-called, of tubo-uterine

* Bandl. *Loc. cit.*, p. 72.

† Fasola. *Ann. di. Obst.*, Firenze, 1888, vol. 10, p. 145 (refers to the cases observed in the Florence Hospital from 1883 to 1885).

‡ L. Meyer (*Hosp. Tidende*, 1890, vol. 8, p. 677) mentions 10 cases, one of which occurred in his own practice.

or interstitial foetation, and of tubo-abdominal foetation, a sub-variety of which has been described as tubo-ovarian. If the tube rupture and the foetus continue to develop in the peritoneal cavity, the foetation is secondarily abdominal. The latter condition, according to many writers, may also be primary. If the rupture occur at the adherent border of the tube the foetus may continue to develop in the substance of the broad ligament, and this variety of foetation has been called "sub-peritoneo-pelvic."* Lastly, though their number is much more restricted than was formerly thought, there are some well-marked cases of development of the ovum on the surface of the ovary (ovarian foetation),



Fig. 376.—Tubal foetation at 2½ months; the sac is open (Bouilly).

which are separated from abdominal foetation by certain anatomical characteristics.

Foetation in a rudimentary horn of the uterus is so different from normal pregnancy, and so nearly akin to other foetal cysts, that it requires to be described immediately after extra-uterine foetation, from which it is distinguished only with the greatest difficulty. It is on this account that the term "ectopic" foetation would be preferable to "extra-uterine foetation."

* Dezelmeris (*Journ. des. conn. Médico-chir.*, Jan., 1837, vol. 5, p. 1) coined this name for one of the thirteen different varieties that he distinguished.

Pathological anatomy.—Tubal foetation properly so-called.—Out of a series of 122 cases, Hennig* found that the ovum was situated in the middle of the tube 77 times; the other cases were thus divided: 10 times close to the uterus, 17 times nearly at the middle of the tube, 5 times in its outer third, 5 times in its outer fourth.

Directly the ovule has become fixed the tubal mucous membrane undergoes a change, which approximates its appearance to that of the uterine decidua; Rokitsansky has well described the swollen condition of the mucous membrane, the villousities of which become entangled with those of the chorion; there is but moderate adhesion until the time when the placenta is formed; the uterine orifice of the tube may remain patent in such a way that the transformation of the mucous membrane may extend into that of the uterus.

In the three first months, the small tumour found on opening the belly has nothing to distinguish it from an ordinary hæmato-salpinx, for there is generally an effusion of blood into its cavity. It has the shape of an egg or of a bagpipe (fig. 375), and contains either a transparent liquid in the middle of which the embryo floats, or clots more or less recent, and sometimes laminated like those in an aneurysmal sac. It may then be difficult to find any trace of the foetus. Frequently the discovery alone of chorionic villi on the wall will allow of any diagnosis of the nature of the tubal cyst.† The latter is usually pediculated, but sometimes is largely adherent to the edge of the broad ligament, into the substance of which it penetrates more or less, while at the same time it separates its component layers. Rarely the walls of the cyst are thin and transparent, allowing the embryo to be seen through them.‡ Hennig has remarked that the muscular tunic of the tube hypertrophies until the end of the second month; but later, under the influence of the distension, it becomes thinner and ruptures. Early rupture is the commonest termination of tubal pregnancy, generally it occurs very early. Out of 45 cases examined on this point by von Hecker,§ it occurred 26 times during the first two

* C. Hennig. *Die Krankheiten der Eileiter und die Tubenschwangerschaft*. Stuttgart, 1876.

† Baudron and Pilliet. *Bull. Soc. anat.*, May, 1891.

‡ Slavjansky. *Centr. f. Gyn.*, 1889, No. 48, p. 884.

§ Von Hecker. *Monatsschr. f. Geb.*, Berlin, 1859, vol. 18, p. 84.

months, 11 times during the third, 7 times during the fourth, and once during the fifth. Out of 8 cases of medico-legal autopsies, Hoffmann* noted that rupture occurred 7 times during the second month, once during the third. The dimensions of the ruptured cyst did not as a rule exceed those of a hen's egg. Kaltenbach† mentions as the immediate cause of rupture, the adhesions that prevent extension of the sac. Rupture of



Fig. 377.—Tubal extra-uterine foetation, ruptured.

Td, right fallopian tube, in which the laceration *D* is seen beneath the embryo; *Od*, *Ld*, right ovary and round ligament; *Tg*, *Lg*, left tube and round ligament; *C*, cervix uteri. (Foetus at nearly 2 months; woman died in a few hours of internal hæmorrhage. Professor von Hoffmann's specimen placed in the museum of legal medicine at Vienna.)

very vascular adhesions is, moreover, already of itself a source of serious hæmorrhage; Kaltenbach has seen one case in which it was fatal. Freund‡ found in one case, hitherto unique, that the rupture of the tube depended upon its having undergone myxomatous degeneration.

* E Hoffmann. Allg. Wien. med. Zeitschr., 1888, No. 25.

† Kaltenbach. Obst. and Gyn. Soc. of Berlin, Dec. 14, 1888 (Centr. f. Gyn., 1889, No. 5, p. 74).

‡ Freund. Congress of German Scientists and Medical Men at Heidelberg, 1889 (Ibid., 1889, No. 40, p. 690).

Rupture of the tube generally occurs into the peritoneum, and causes the fulminating variety of hæmatocele called "cataclysmic." If it occur into the substance of the broad ligament an extra-peritoneal hæmatocele is the result, and the resistance of the broad ligament has the effect of limiting the hæmorrhage.

The evolution of tubal fœtation varies. In some cases, which really are exceptional, the embryo dies early, and then it undergoes disintegration, and no traces of it are to be found. The



Fig. 378.—Extra-uterine interstitial fœtation, ruptured.

D, laceration; *C*, cervix; *Td*, *Ld*, tube and round ligament of right side; *Tg*, *Lg*, tube and round ligament of the left side. (Fœtus at nearly four months; woman taken with vomiting in the evening, death next day from internal hæmorrhage. Professor von Hoffmann's specimen placed in the museum of legal medicine at Vienna.)

tubal sac ceases to increase in size, but the internal hæmorrhage which has produced or accompanied the death of the embryo, converts this sac into a hemato-salpinx. The lesion changes its clinical and prognostic characteristics with its nature. It is very unlikely that the surgeon who later removes it will recognise its true origin, though by histological examination of the walls he may possibly discover a few chorionic villi. It is even possible that complete absorption of the contents of the

tube may be effected after a longer or shorter lapse of time. It is this result that those practitioners hope to obtain who endeavour to bring about the death of the fœtus by morphia injections or by electricity.

If the fœtus succumb later, it forms a foreign body which may become encysted and converted into a "lithopædion," as we shall see later on, or lead to accidents which bring about its elimination. Lastly, the fœtus may live until term; and this occurs especially when the tube is distended or has given way on the side of the broad ligament, the separated layers of which have protected the enclosed fœtal cyst from rupture into the abdominal cavity (so-called "sub-peritoneo-pelvic fetation"). Then at term there supervene the curious symptoms of false labour, and unless surgery come to the aid of nature, the child dies. When the woman survives, there arises the series of phenomena common to all cases of ectopic fetation arriving at term, to which I shall have later to revert.

Tubo-uterine or interstitial fetation.—Here the ovum is developed in the very short portion of the tube that runs between the uterine walls. It is free over a portion of its surface which is separated from the peritoneal cavity by false membranes. Such cases are very rare, and have been collected by Baart de la Faïlle.* When the fœtal cyst ruptures, hæmorrhage may occur per vias naturales. The placenta and even the fœtus may be ejected, or may fall into the peritoneal cavity. The ordinary duration of this variety is longer than that of the preceding; it may come to term,† but it may also terminate before the fourth month by fatal hæmorrhage. According to Schultze,‡ this variety is very common and often unrecognised; many abortions supposed to be of normal pregnancies own this origin.

Tubo-abdominal fetation.—An ovum which has developed at the external extremity of the tube is only partially enveloped thereby, and the external portion of the sac is formed by false membranes; it is adherent to the neighbouring parts, broad ligaments, ovaries, omentum, intestines, bladder, uterus, and, if the cyst undergo sufficient development, it may even come to be

* J. Baart de la Faïlle. *Verhandl. über Graviditas tubo-uterina* (Monatschr. f. Geb., 1868, vol. 31, p. 208).

† Spiegelberg. *Arch. f. Gyn.*, 1878, vol. 13, p. 73.—Leopold, *ibid.*, 1882, vol. 19, p. 210.

‡ Schultze. *Verhandl. des 2ten Kongress der deutschen Gesells. f. Gyn.*, p. 231.

in relation with the spleen, the kidneys, or the liver. The placenta usually occupies the true pelvis. The ovary may be flattened and so intimately connected with the walls of the sac that the foetation deserves the name of tubo-ovarian. The possibility of extension of the cyst on the abdominal side, by successive attacks of peritonitis and the formation of false membranes, allows of our understanding that rupture may sometimes be delayed until term.

It is possible, moreover, that many so-called cases of tubo-ovarian and even ovarian foetation should receive quite a special explanation. Vulliet* has advanced the view, with some apparent reason, that occasionally there are cases of pregnancy occurring in a pre-existing tubo-ovarian cyst. He reminds us that Burnier† demonstrated the presence of Graafian follicles in the wall of a tubo-ovarian cyst, removed by Schröder, and therefore that impregnation is possible within these cysts. Taking his stand on this fact, and on a case he had himself observed, he admits that pregnancy may occur in these cysts, distending them as would a collection of fluid. Paltauf, Schaeffer, von Rosthorn, and Lihotzky‡ have since published confirmatory cases. I have myself seen a case of this kind. It was one of a kind of hæmato-oophoro-salpinx, manifestly due to an extra-uterine foetation, as was shown by microscopical examination.

Ovarian foetation.—This variety has been the subject of much discussion; many cases which have been referred to it were true tubo-abdominal foetations, with intimate but secondary adhesion to the ovary. It is not, however, impossible that fecundation may occur in a Graafian follicle which has ruptured in such a way that the placenta is inserted upon the ovarian tissue; but these cases are very rare. Bandl§ only succeeded in finding one satisfactory case of ovarian pregnancy in the rich collection of the museum at Vienna, and casts some doubt upon

* Vulliet. *Arch. f. Gyn.*, 1883, vol. 22, p. 427.

† H. Burnier. *Ueber Tubo-ovariälcysten* (*Zeitschr. f. Geb. u. Gyn.*, 1880, vol. 5, p. 357).

‡ Paltauf. *Arch. f. Gyn.*, 1887, vol. 30, p. 456.—Schaeffer. *Zeitschr. f. Geb. u. Gyn.*, 1889, vol. 17, p. 13.—A. von Rosthorn. *Wien. klin. Woch.*, 1890, No. 22, p. 417, and *Verhandl. der deutschen Gesells. f. Gyn.*, 4th session, Bonn, 1891, p. 155.—G. Lihotzky. *Drei Fälle von Graviditas extra-uterina* (*Wien. klin. Woch.*, 1891, p. 184, case 2).

§ Bandl. *Die Krankh. der Tuben., &c.*, p. 51, and *Obst. and Gyn. Soc. of Vienna*, May 1, 1888 (*Centr. f. Gyn.*, 1889, No. 5, p. 80).

it. Puech,* it is true, cites many examples of the condition; but, as I have said, it is not sufficient to demonstrate the presence of ovarian tissue in the walls of the cyst to establish an indubitable anatomical diagnosis,† since intimate adhesion of the ovary may quite well be an ulterior epi-phenomenon.

According to Hueppe,‡ one may admit for the explanation of ovarian foetation the following processes: fecundation occurs on the ovary; either the rent in the follicle then closes up and the foetus develops in the interior of the ovary, after the manner of a cyst; or the laceration in the follicle does not close, and the foetus, while developing, escapes from it, although the placenta remains in the ovary.

Besides these two classes of ovarian foetation, Hueppe admits the existence of a third, external ovarian pregnancy; in this variety the formation of the placenta would be analogous to that of abdominal pregnancies which would formerly have been confused with external ovarian pregnancy. Patenko§ has seen a case of extra-uterine foetation that developed at the expense of the right ovary; he gives as characteristic of the ovarian variety: 1. Diminution in the size of the right ovary (length of the right ovary 16 mm., of the left ovary 35 mm.; breadth of the right ovary 19 mm., of the left ovary 18 mm.). 2. Transformation of a portion of the ovary into cystic cavity. 3. Microscopic examination which showed that the wall of this cavity had the same structure as the ovary; further, in the interior of the cavity were found foetal remains and a trace of placenta.

Heineken|| only regards as ovarian foetation that in which the placenta is found in the very interior of the ovary and the foetal sac in the peritoneal cavity. Zmigrodzky,¶ after minute

* Puech. On Ovarian pregnancy (*Ann. de Gyn.*, 1878, vol. 10, p. 1).

† Cohnstein. *Arch. f. Gyn.*, 1877, vol. 12, p. 355.—F. Patenko. *Graviditas ovarialis von kurzer Dauer.* (*Arch. f. Gyn.*, 1879, vol. 14, p. 156).—J. Collet y Gurgui. *Die Ovarialschwangerschaft vom pathologisch-anatomischen Standpunkte*, Stuttgart, 1880.—Werth. *Beiträge zur Anatomie und operativen Behandlung der Extra-uterin-schwangerschaft*, Stuttgart, 1888.

‡ Hueppe. *Die Bedingungen der Ovarial-und Abdominalschwangerschaft.* Inaug. Dissert., Berlin, 1876.

§ Patenko. *Loc. cit.*

|| Heineken. *Ueber Extra-uterinschwangerschaft mit Berücksicht eines Falles von Laparotomie bei Graviditas ovaria.* Halle, 1881.

¶ C. Zmigrodzky. On extra-uterine pregnancy. St. Petersburg, 1886 (*Anal. in Centr. f. Gyn.*, 1888, p. 146).

examination of the opinions enunciated on the diverse varieties of ovarian foetation, admits two varieties, according as the ovary is the single and primary soil for the development of the ovule, or according as, with the ulterior development of the pregnancy, there occurs an intimate union of the placenta with the ovarian tissue. In general, he says the point of placental attachment plays the most important part in the classification of extra-uterine foetations. Simple adhesion of the foetal sac to the ovary must be distinguished from organic connection of the placenta with the ovarian tissue.

Werth* analysing the characteristics of ovarian foetation says that at bottom there is only one positive sign, but that its value for anatomical diagnosis is of the utmost importance; it is when the foetal sac arises manifestly from the appendages, and the condition of the Fallopian tube excludes all possibility of its participation in the formation of the foetal sac.

Mouratoff,† Säger, Leopold, and Mackenrodt have reported cases of ovarian foetation that are quite demonstrative.

Abdominal foetation.—When the ovule falls into the peritoneal cavity and is impregnated, it may there pass through all the phases of its development; it generally becomes enveloped in a pseudo-membranous sac which may be greatly thickened from the addition of successive layers, and adheres firmly to neighbouring parts. In some rare cases, however, the foetus has, on the contrary, no other envelope than a thin and transparent membrane; but in the viscera in contact with the ovum there occurs extreme increase of vascularity. There is nothing here which recalls the presence of a decidua, as in the case of tubal foetation.

The placenta has no regular form, and may reach to enormous proportions. Gaillard Thomas‡ reports that in the course of a laparotomy that he was performing for an ectopic foetation one of his assistants asked him if the body which he was proceeding to remove, and which was, as a matter of fact,

* Werth. *Loc. cit.*

† Mouratoff. On ovarian pregnancy (*Ann de Gyn.*, Feb., 1890, vol. 33, p. 81).—M. Säger. *Centr. f. Gyn.*, 1890, p. 522.—Leopold. *Internat. Congr. of Med. Sci.*, held at Berlin, Aug., 1890 (*Berl. klin. Woch.*, 1890, p. 762).—Mackenrodt. *Centr. f. Gyn.*, 1891, p. 1004.

‡ Gaillard Thomas. *A System of Gynecology* (edited by Mann). Philadelphia, 1888, vol. 2, p. 181.

the placenta, was not the liver, so great was its resemblance to that organ.

No compression intervening to strangle the ovum in its development, the latter may be complete and not be interrupted by rupture or hæmorrhage.

The placental circulation has been known to continue after the death of the fœtus, and to cause fatal hæmorrhage.* But as a rule this circulation gradually ceases, and is completely abolished two months after the death of the embryo.†

The view has been sustained‡ that abdominal fœtation is

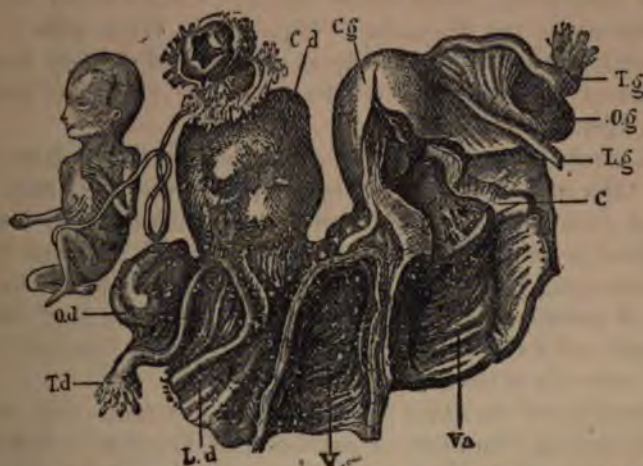


Fig. 379.—Ectopic fœtation in a rudimentary horn of the uterus, ruptured.

C.d, right horn, closed on the vaginal side, seat of the fœtation; at the upper part of the horn is seen the laceration *O.d*, right ovary; *T.d*, right tube; *L.d*, right round ligament; *C.g*, *O.g*, *L.g*, left uterine horn, ovary, tube, and round ligament; *V.a*, vagina; *V*, bladder. (Fœtus at 3½ months; woman died of internal hæmorrhage in six hours. Professor von Hoffmann's specimen placed in the museum for legal medicine at Vienna.)

always secondary, and subsequent to the rupture of a tubal fœtation. It is probable that this is the most frequent cause of origin; but some carefully observed cases§ establish the reality of primary abdominal fœtation.

* Hart and Barbour. *Manual of gynecology*, French trans., Paris, 1886, p. 648.

† L. Tait (B. M. J., June 13, 1891) has proved by laparotomy that the placenta may continue to develop after the death of the fœtus. This case is evidently exceptional.

‡ Mayrhofer. *Von der Unfruchtbarkeit des Weibes*. Stuttgart, 1878.

§ Schlegelndal (Frauenarzt, 1887, No. 2, anal. in Centr. f. Gyn., 1887, No. 27, p. 438) observed an abdominal fœtal cyst as large as the fist in the midst of coils of intestines

Festation in a rudimentary horn of the uterus.—Cases of this kind have often been misinterpreted and wrongly attributed to tubal fœtations, as Küssmaul * perfectly demonstrated. The first well observed case was that of Dionis. Säger† collected all the cases published until 1884; they were 29 in number; 23 terminated by rupture during the first six months; 3 by calcareous incrustation; 4 were treated by laparotomy. Bandl,‡ Landau, and Wyder have published similar cases.

It may be difficult even at the autopsy§ to decide whether the tumour has developed in the tube (interstitial variety) or in a rudimentary horn of the uterus. Consequently on the living subject the diagnosis is impossible. What adds to the difficulty is that the tumour developed in a rudimentary horn is separated from the rest of the uterus by a kind of pedicle (fig. 379).

A careful examination will show characteristic relations of the tube and of the round ligament with the fœtal cyst. In tubal fœtation the tube is very much diminished in length, reduced to its uterine segment, and the round ligament is on the *inner side* of the sac. When, on the other hand, the case is one of gestation in a rudimentary horn, the tube is of normal length, and its insertion, like that of the round ligament, is on the *outer side* of the sac.

Condition of the uterus in extra-uterine festation.—One of the most curious characters of extra-uterine festation is furnished by the considerable changes undergone by the uterus, while the work of gestation is being carried on outside of it. There occurs a general hypertrophy of the organ which enlarges its cavity ;

adherent to the spleen. The tubes were intact, and consequently the cyst could not have come from a ruptured tubal fœtation.—Zmigrodzky (*loc. cit.*, p. 146) has collected all the cases of ectopic gestation published between 1878 and 1888, and has found several undoubted cases of primary abdominal festation, with intact ovary and tube, and insertion of the placenta at a distance from these organs. He finds 198 cases of tubal festation, 18 of ovarian, and 120 cases of abdominal

* Küssmaul. Von dem Mangel der Verkümmung und Verdopplung der Gebärmutter, Würzburg, 1859.

† Säger. Ueber Schwangerschaft im rudimentären Nebenhorn bei Uterus duplex (Gesell. f. Geb. und Gyn. in Leipzig, in Centr. f. Gyn., 1883, p. 324) and Arch. f. Gyn., 1884, vol. 24, p. 232.

‡ Bandl, *loc. cit.*, p. 53.—L. Landau. Deutsche med. Woch., 1890, No. 35, p. 591.—

§ An operator cured his patient by laparotomy.—Th. Wyder (Arch. f. Gyn., 1891, vol.

the patient from hemorrhage.

Journ., May, 1886, vol. 21, p. 971.

and at the same time the mucous membrane undergoes changes perfectly analogous to those occurring in a gravid uterus, as is proved by Ercolani's and Langhaus's researches; a plug of mucus also fills up the cervical canal. These modifications are the more marked the closer the ovum is to the uterus. They are evidently of a mixed nature, and due partly to trophic phenomena of a reflex or sympathetic nature, similar to those which occur at the same time in the breasts, and partly to the general increase of the pelvic circulation. Hennig, however, has noted some exceptions.

The position of the uterus varies with that of the ovum; at the third or fourth month the ovum generally occupies Douglas' pouch, and the uterus is pushed forwards and more or less to one side in such a way that its contour can be made out by abdominal palpation.

The ovary situated on the same side as the embryo generally contains a large corpus luteum, the origin of which has given rise to much discussion.

Cases have been reported in which the extra-uterine foetation was accompanied by a normal pregnancy.*

Anatomical modifications subsequent to death of the foetus.—The foetal cyst may rupture early, leading to rapid death or becoming the origin of a retro-uterine hæmatocele in which the presence of the embryo may soon become no longer recognisable. If the foetus come to term its life is prolonged for a little beyond the natural limit and then it dies. Two different sets of circumstances may then occur: either it is not tolerated and leads to accidents, which end either in the death of the patient or in the expulsion of the foetal debris; or else the foreign body is not resented, but undergoes metamorphoses which tend to transform it in such a way as to make it more supportable for the tissues (fatty degeneration, calcification). These foetuses, infiltrated with calcium salts and sometimes dating from a very distant period, have received the name of lithopædions.†

* R. Worrell (B.M.J., March 28, 1891) has related an interesting case of this kind.

† With reference to lithopædion consult the following works: Kuchenmeister (Centr. f. Gyn., 1880, No. 22, p. 515, and Arch. f. Gyn., 1881, vol. 17, p. 158), in which are collected all the old and classical cases of the foetus lapideus of Rousset (1590).—Sappey. Comptes rendus de l'Acad. des sciences, Aug. 22, 1887.—Virchow, Gesammelte Abhandl., 1856, p. 790.—Gaches Sabraute. Microscopic study of a litho-

Symptoms of ectopic foetation.—Since the woman may present all the signs of ordinary pregnancy, she often believes that she is normally enceinte. On the other hand all physical signs may be wanting at the outset, or, at least, be so little pronounced, that nothing reveals the presence of the foetus. Thus swelling of the breasts, although the rule, may be wanting. Menstruation, which at first was interrupted, re-appears, and sometimes takes on the characters of a continuous menorrhagia. The expulsion of a decidua, and increase in size of the belly, are the first symptoms that arouse attention. Nevertheless this last symptom in the vast majority of cases is but little pronounced when rupture occurs about the second or third month. This accident occurring while the patient is in good health, and soon after a meal, has led to the question of poisoning. The knowledge of these facts is of very great importance in forensic medicine.* The symptoms are those of internal hæmorrhage, sometimes fulminating in character. It may happen that after a first attack she may recover and have other attacks later. Death occurs then after two or three, or even more slowly by successive hæmorrhages.† I shall not return to the symptoms of internal hæmorrhage, and of the hæmatocele which may succeed on rupture, which have already been considered in detail (cf. the chapter on Intra-Peritoneal Pelvic Hæmatocele). When the pregnancy reaches the last phases of its evolution, which occurs especially in the intra-ligamentous and abdominal varieties, phenomena of vesical and of rectal compression are seen at the same time as inflammatory phenomena occurring in successive attacks. The fever and the perpetual pain, which forms one of the most characteristic phenomena,‡ usually oblige the patient to keep her bed. Freund has noticed in abdominal foetation colic and diarrhœa,

pædion. Thesis, Paris, 1884.—W. H. Fales. Lithopædion; history of a case with notes on eleven others (Annals of Gyn., Boston, Oct., 1887, vol. 1, p. 14).

* Parry. Extra-uterine pregnancy, &c., London, 1876, p. 155.—Chaye. Signs and diagnosis of extra-uterine foetation. Thesis, Paris, 1882. (This work contains two important cases of Brouardel's.)

† Maygrier (Terminations and treatment of extra-uterine foetation. Thesis, Paris, 1886, p. 15) reports an important case of Pinard's as an example of this termination.

‡ Too much importance, however, must not be placed upon them, as is proved by the following case, reported by H. C. Coe to the Obst. Soc. of New York, Oct., 1889 (Amer. Jour. of Obst., Jan., 1890, p. 94). The case was one of a woman who presented

arising from irritation of the intestine by the adherent foetal cyst. Compression of the rectum has given rise to complete intestinal obstruction.*

The pain takes on an expulsive character at a time more or less distant from that at which delivery should occur. The cyst may then rupture into the abdomen, and the patient may succumb to acute or chronic peritonitis, which sometimes is of septic character.† If this period is survived the disease enters into a phase of toleration for the foreign body which is absorbed or converted into a lithopædion; but this period may also be interrupted by grave inflammatory accidents, arising tardily and when all danger seemed to have passed away. A lithopædion of sixteen years' standing has been known to occasion intestinal obstruction and peritonitis,‡ or to be eliminated by the rectum at the end of a lapse of time varying from one to forty-three years.§

Another condition may also present itself: rupture, instead of occurring into the abdominal cavity, occurs between the layers of the broad ligament. The hæmorrhage is then less, it remains limited, and the symptoms are less serious. Moreover, if the foetus continue to live, the extra-peritoneal development of the

the symptoms of pregnancy, but complained of such extreme pain that it was thought to be a case of ectopic gestation. Laparotomy, followed by abortion, showed, however, that the pregnancy, which was of three months' duration, was perfectly normal, and subsequent interrogation brought to light the fact that the patient, who was more or less hysterical, had considerably exaggerated her sensations. A circumstance worth noting is that she had been previously subjected to an electrical treatment sufficiently strong to have produced a large eschar on the abdomen without determining the death of the foetus. The patient recovered.

* Chevalier. Arch. de tocol., 1882, p. 73.

† Jacquemier (Text-book on Midwifery, 1846, vol. 1, p. 383) has insisted upon the cachexia, to which some women succumb long after the death of the foetus, without any inflammatory lesion being revealed at the autopsy; this evidently depends upon a putrid intoxication due to the altered fluids in the foetal sac.—Zweifel (Leipzig Obst. and Gyn. Soc., Feb. 18, 1889, in Centr. f. Gyn., 1889, No. 31, p. 557) has demonstrated the presence of enormous numbers of germs in all the liquids of a foetus at term, which had been dead for some time (abdominal extra-uterine foetation). The woman recovered, though at the time of the performance of the laparotomy she was in the height of septicæmia.

‡ Oettinger. Bull. Soc. Anat., 1883, p. 286.

§ Atkinson (The Med. Record, 1881, vol. 19, p. 99) reports a case of elimination at the end of 8 years; Gripouilleau (Arch. de tocol., 1874, p. 703), after 14 years; Laupus (Inaug. Dissert., Göttingen, 1876), after 27 years; Benicke (Berl. klin. Woch., 1876, p. 434), after 28 years; Metcalfe (Med. Times and Gaz., 1872, vol. 1, p. 655), after 43 years; the woman was 68 years of age when she began to expel fragments of bone by the rectum.

ovum is more favourable for the success of a subsequent operation.

Lastly, in some extremely rare cases, rupture takes place into the uterus itself; for this, it is necessary for the foetation to have developed in the substance of the uterine walls, viz., it must be tubo-uterine or interstitial.*

Spontaneous expulsion may occur after suppuration of the cyst and evacuation of its contents externally. It is commonly by an abscess of the abdominal walls† or by a perforation of the rectum‡ that the foetal remains make their escape; they are then reduced to the skeleton and a few unformed shreds. More rarely this perforation occurs through the vagina§ or the bladder.||

* Von Maschka (Wien. med. Woch., 1885, No. 42, p. 1279) has reported the following curious case: in a judicial autopsy required in a case of sudden death (which in Austria always necessitates the intervention of the medical jurist) there was found an interstitial foetation with rupture into the uterine cavity. The body of the foetus had passed through the laceration and thence into the uterus, whence it had been extracted, but the head had remained in the foetal cyst.

† Parry (*loc. cit.*) found this mode of elimination 40 times out of 248 cases of extra-uterine foetation which had exceeded term, with 10 cases of death. But almost all these cases occurred prior to the antiseptic era.—Deschamps (on the various modes of termination of extra-uterine foetation, Thesis, Paris, 1880, p. 19) reports 5 cases all followed by recovery. At the present day this should be the rule.—Shield. Trans. Obst. Soc., Lond., April 1, 1891.

‡ Complete expulsion has been observed by Pigeolet, Bull. de l'Acad. méd. de Belgique, 1879, vol. 15, No. 1, by Burkhardt, Berl. klin. Woch., 1881, p. 698, and by M. Autriello, Wien. klin. Woch., 1889, p. 127, &c. But generally elimination is partial and successive, and may last for months or even years.—Späth (Wurtemb. med. Corresp. Blatt., 1883, vol. 8) has cited a case in which it was prolonged for over 20 years; it may lead to septicæmia unless surgery intervene and clear out the seat of irritation. Parry, out of 248 cases of pregnancy which had exceeded term, found it in 65. The seriousness of this termination has been very greatly exaggerated by Parry (34 per cent.) and Deschamps (48 per cent.).—Maygrier, out of 18 cases published between 1876 and 1886, only found one death.

§ Priestley (Trans. Obst. Soc. Lond., 1880, vol. 21, p. 24) saw this supervene at the end of 12 years.—Purefoy (Dubl. Journ. of Med. Science, April, 1877, vol. 68, p. 862) gives a case in which suppuration extended for over a year before ending in recovery.—Parry notes this termination in only 5 per cent. of the cases.—The prognosis is uncertain on account of the small number of known cases. Simultaneous opening of the cyst into the vagina and the intestine gives rise to a complex fistula, intestino-cysto-vaginal; L. H. Petit (Ann. de Gyn., Jan., 1883, vol. 19, p. 41) has described these cases in his paper on ileo-vaginal anus.

|| Schultze. Jen. Zeitschr., 1864, vol. 1, p. 381.—Hayem and Girandean. Arch. de. tocol., 1882, p. 481.—Monnier. Progrès méd., 1884, p. 1010.—Werth. Beiträge zur Anatomie, &c., Stuttgart, 1887, p. 126.—Winckel. Samml. klin. Vortr., 1890, No. 8.—Schantz (Beitr. zur Casuistik, Prognose und Therapie der Extra-Uterinschwangerschaft, Prague, 1891, p. 25) has seen a case in which parts of the foetus were eliminated on several occasions—a year and a half after its death by the vagina, then by the rectum, and three and a half years later by the bladder.

If surgery do not intervene, it may give rise to interminable suppuration.

Diagnosis.—For purposes of diagnosis it is indispensable to divide extra-uterine foetation into periods, to each of which there corresponds a very definite clinical type.

1. *Extra-uterine foetation before the fifth month; embryonic period of the ovum from the commencement of ectopic foetation up to the time at which undoubted signs are given of the life of a fetus.*—These are by far the most common cases, and also are those which may give rise to the greatest uncertainty. It is true that this latter has not any real importance from the point of view of treatment, as we shall see. This period corresponds to the first four or five months of the life of the foetus; but if the foetus be dead it may be greatly prolonged without any appreciable modification, so long as no accident (rupture, inflammation of the cyst) comes to upset the course of the disease. The rational symptoms have nothing striking about them; they are more or less definite disorders of the generative system, similar to those accompanying all uterine disease; in particular, menorrhagia has been noted so great as to call for plugging;* at other times there is no disorder of menstruation at all.† Then, too, all the signs of a normal pregnancy may be observed at first. Suppression of menstruation, changes in the breasts, sympathetic disorders of the digestive and nervous systems, &c. To avoid mistakes, an endeavour should be made to define exactly the limits of the uterus, the size of which does not correspond with the duration of the pregnancy.

Expulsion of a decidua, coming on after an attack of pain, is often indicative of some interference with the life of the ovum and of death of the embryo; the foetation may, however, continue after this elimination, which has often been taken for an abortion, especially if metrorrhagia have occurred at the same time; but after this expulsion the tumour persists if the case be one of ectopic gestation, but disappears if simple abortion have happened.

Painful phenomena due to the formation of intestinal adhesions have been much complained of in some cases of tubo-abdominal

* Leopold. *Arch. für Gyn.*, 1876, vol. 10, p. 248, and 1884, vol. 19, p. 210.

† Olshausen. *Third Congress of German gynaecologists (Centr. f. Gyn.*, 1889, No. 30, p. 519).

or abdominal ectopic foetation. It is also in cases in which the ovum is situated in Douglas' pouch that grave symptoms of compression of the rectum and the ureters have been noted. They have then been mistaken sometimes for fibroids on the posterior surface of the uterus.

By vaginal and bimanual examination is felt at the side of the uterus, and often one with it, but sometimes separated by a furrow and a pedicle, a tumour which in no respect differs from the more common tubal tumours, hydro-, hæmato-, and pyosalpinx.* If one succeed in making out the limits of the body of the uterus, it is found to be somewhat increased in size and deviated laterally; there is no sensible modification of the cervix. When the tumour, which is more rarely the case, is situated in Douglas' pouch, it is incarcerated there, and about the fourth month "ballottement" is perceived through its walls. Under these circumstances retroversion of the gravid uterus may be diagnosed in mistake. Sometimes retroversion has been diagnosed when the case was one of extra-uterine foetation; sometimes, on the contrary, it has been suspected to be an extra-uterine foetation when in reality there was retroversion. Passage of the uterine sound, which was fearlessly undertaken in a case of Bailly's, further obscured instead of elucidating the diagnosis, for the sound only passed for 8 cm. when there was retroversion of the gravid uterus. One sign can put the surgeon on the right track: examination of the foetal cyst never allows of any contractions being perceived in it, while they may sometimes be found during bimanual examination in a case of retroversion.†

Rectal examination will complete the information obtainable on the size and the connections of the tumour. One must, however, remember that these examinations must be carried out with the greatest caution, on account of the danger of rupture and of the terrible hæmorrhage which may result therefrom.‡

* This error in diagnosis has probably been made in the majority of cases of tubal foetation extirpated before the fourth month. It is often indicated more or less explicitly in the cases. Cf. for example, Tuttle, *Amer. Journ. of Obstet.*, 1889, p. 951. —Hanks, *Obst. Soc. of New York (Amer. Journ. of Obst., Jan., 1890, p. 92)*—Bouilly, *Bull. et Mém. de la Soc. de chir.*, Dec. 4, 1889, p. 762.

† Tarnier and Budin. *Treatise on Obstetrics*, 1888, vol. 2, pp. 232, 239, 240, and 519.

‡ Maas (*Beiträge zur Tubenschwangerschaft*, Inaug. Dissert., Berlin, 1887) has published a case of death thus supervening in the course of an exploration.

Passage of the uterine sound must be formally proscribed for the same reason, as it may lead to contractions of the uterus and of the tube.*

Diagnosis of an extra-uterine fœtation from an ectopic fœtation in a rudimentary horn of a bifid uterus is, one may say, impossible on the living subject, since sometimes even on the dead body it is very difficult to make on account of the changes produced around it by the development of the foetal cyst.†

Diagnosis of rupture is certain when signs of internal hæmorrhage make their appearance. With regard to the death of the fœtus, it may be at least suspected when, after expulsion of the decidua, the sympathetic disorders of pregnancy gradually disappear. Occasionally augmentation of size and of sensibility of the tumour has been noticed, corresponding to a hæmorrhage into the ovum, which kills the embryo, and is soon followed by diminution and induration of the foetal cyst.

2. *Extra-uterine fœtation after the fifth month: foetal period properly so-called.*—In ectopic fœtation which has passed the fifth month, the sympathetic phenomena of gestation persist, accompanied by abdominal pain which is sometimes very acute and may absolutely confine the patient to bed; these pains, losses of blood, the irregularity, and the lateral situation of the tumour may prevent its being confounded with a normal pregnancy. The cervix also is much less softened in ectopic gestation, and digital examination combined with palpation often allows of our making out the limits of the uterus, at any rate in its lower segment, of recognising that it is not dilated to any extent, and that it is pushed to the opposite side to that occupied by the tumour.

As regards the diagnosis of the variety of ectopic fœtation, it is impossible. It was formerly believed that every extra-uterine fœtation that passed the fifth month was, on that very account,

* Fränkel. Breslauer ärzt. Zeitschr., 1882, No. 7, p. 78.

† Mundé (Pregnancy in the rudimentary horn, &c., in Amer. Journ. of Obst., Jan., 1890, p. 23) reports a case in which he performed laparotomy, believing that he had to do with a tubal fœtation; he closed the abdomen after having recognised his mistake with difficulty. Abortion followed, but the patient recovered. Similar mistakes in diagnosis were made and recognised after laparotomy by McDonald (Obst. Trans. of Edinburgh, 1884-1885, p. 76), who thought the case was one of a fibroid; by Selifossowski, J.-E. Janvrin, H.-O. Marcy (Van der Weer, Concealed pregnancy, in Amer. Journ. of Obstet., Nov. 1889, vol. 22, p. 1145).

abdominal. Now, we know that the tubo-abdominal, the tubal intra-ligamentous or sub-peritoneo-pelvic, and the ovarian and tubo-ovarian, may all go on till term. In intra-ligamentous foetation the tumour is usually covered with a fairly thick shell, while in abdominal pregnancy they are immediately perceptible beneath the abdominal walls. The seat of the placenta will sometimes be indicated by palpation (thrill) and by auscultation (uterine souffle).

Diagnosis of false labour is necessary when expulsive pains occur which, as has been determined during a laparotomy,* are due to uterine contractions at regular intervals, as in normal parturition. This false labour ordinarily comes on precisely at term, but sometimes prematurely at the seventh month. Rarely the normal period of gestation is exceeded. This painful crisis must not be confounded with the phenomena of rupture.

Death of the foetus is announced by cessation of the heart sounds, by increase in size and softening of the tumour due to venous thrombosis and the effusion of liquid which depends thereupon, and by arrest of milk formation. If the foetus be still tolerated it then undergoes a process of mummification, which tends to transform the ovum into a solid adherent tumour which may easily be confounded, in the absence of a good previous history, with a uterine fibroma, an old pelvic hæmatocele, an ovarian tumour, and in particular with a dermoid cyst, peritoneal cancer, &c. A history of undoubted pregnancy not followed by parturition should be most carefully sought for. When in doubt and in the presence of serious symptoms, laparotomy, at first exploratory, should be performed, which will sometimes, by giving exact information of the nature and the connections of the cyst, allow of the surgeon's removing it directly, or of attacking it afterwards from some other direction.†

Fistulæ consecutive to the elimination of suppurating foetal cysts will be diagnosed by the skeletal remains to which they give exit, or which may be reached after dilatation.

* Meadows. *Trans. Obst. Soc.*, 1873, vol. 13, p. 271, and vol. 14, p. 309.—The operation during false labour was performed by Scott.

† L. Brühl (*Arch. f. Gyn.*, 1887, vol. 30, part 1, p. 57) performed laparotomy in a case of this kind three years after the death of the foetus, for symptoms of suppuration of the cyst. He thus demonstrated the impossibility of extracting it through the abdominal incision, and the possibility of opening and evacuating it through the vagina, an operation which led to recovery, in spite of a wound of the bladder.

Lastly, the surgeon may sometimes have to diagnose complications. I refer the reader to works on midwifery* for the study of the exceptional cases of recent or old extra-uterine fœtation complicated by uterine pregnancy; for cases of old extra-uterine fœtation complicated by recent extra-uterine fœtation, and in the last place for cases of extra-uterine fœtation complicated by hydramnios.

Prognosis.—In the first half of ectopic fœtation the great danger is rupture, and left to themselves women succumb in very large numbers, of which the statistics cannot be obtained. On the other hand, an operation which leads to recovery by removing the small foetal cyst is, during this stage, not at all serious. One may therefore say that the prognosis is only serious if the tumour be not recognised nor extirpated. But the state of things is quite different when the second stage has been entered upon. The disease is now in itself very serious, and is also serious as regards its treatment, which becomes more dangerous in proportion as the ninth month is reached, in which hæmorrhage is most to be feared. It is impossible to trust to statistics to get an idea of the mortality of the untreated disease. For so-called spontaneous cure generally occurs by elimination the cyst from suppuration, and this is more or less benign, especially according as it is or is not methodically and antiseptically treated. Bearing these reservations in mind, the following are the figures given by Parry: out of 508 cases that he collected, the fate of the woman was given in 499; 336 times she succumbed, and 163 times she recovered, giving a general mortality of 67·2 per cent.

Fœtation in a rudimentary horn is also very serious if it be left to itself, according to Himmelfarb's researches.† It is, however, probable that these cases often pass undiagnosed when abortion occurs early and before the fœtus has attained sufficient size to prevent it from traversing the narrow pass that separates it from the natural ways.

Treatment.—One fact dominates the therapeutics of ectopic

* Tarnier and Budin. *Loc. cit.*, pp. 553 and 554.

† Himmelfarb of Odessa (*Russian Journ. of Obst. and Gyn.*, 1888, p. 281, anal. in *Munchn. med. Woch.*, 1888, No. 35) has collected 86 cases, of which 24 terminated fatally by rupture of the sac; 3 ended in the formation of lithopædions; laparotomy was performed 7 times, after the death of the fœtus, of which one alone had reached term; 6 recoveries and 1 death.

gestation. At every stage in its evolution it constitutes a formidable danger: there is the danger of foetal hæmorrhage in the first period, the danger of peritonitis and of septicæmia in the second, and the danger of internal suppuration and of compression even when it has long become transformed into an apparently inert residual mass. Werth therefore was quite right when he said that extra-uterine foetation should be considered as a malignant neoplasm and treated as such. The rare cases of toleration and of natural cure cannot justify the expectant method in presence of the fatal accidents that constitute an almost invariable rule, although their onset may be delayed for a longer or shorter time.*

The therapeutic question, therefore, from the point of view of indications is greatly simplified. In point of fact it reduces itself to a question of an opportunity for operation, and to a question of the method to be adopted in extirpation of the foetus.

I must not, however, pass over in silence certain methods of treatment, some of which have now only a historical value, while others even now count some ardent supporters. They all relate to the first period of ectopic gestation, and their object is to bring about the death of the embryo when there is more chance of its being afterwards tolerated or absorbed.

Amongst the archaic or condemned methods I will mention:

Enfeebling the mother by a kind of "hunger-cure" and by purgatives (Ritgen †), the administration of doses of strychnine slightly toxic to the mother (Barnes ‡), the hypodermic injection of ergotine (Janvrin §), mercurial inunction, the administration of iodide of potassium, repeated blood-letting, || puncture of the cyst. ¶

Two methods of bringing about the early death of the foetus

* Schauta (Beitr. zur Casuistik, Prognose und Therapie der Extra-uterinschwangerschaft, Prague, 1891, p. 37) collecting from 1876 to 1891, 626 cases of extra-uterine pregnancy, noted 241 treated by the expectant method with a mortality of 68·8 per cent., whereas 385 upon whom an operation was performed had a mortality of only 26 per cent.

† Von Ritgen (cited by Keller. On extra-uterine foetation, &c., Thesis, Paris, 1872, p. 54) recommends the daily administration of Glauber's salts and pills of ergot of rye.

‡ R. Barnes. Diseases of women, 1874, p. 373.

§ Janvrin. Amer. Journ. of Obstet., Nov., 1874, p. 432.

|| Keller. Loc. cit., p. 54.

¶ Simpson. Edinb. Med. Journ., 1864, vol. 1, p. 865.—Braxton Hicks. Obstet. Trans., Lond., 1866, vol. 7, p. 95.—Freund. Arch. f. Gyn., 1883, vol. 22, p. 113.

are still employed and discussed, viz., injection of morphine into the sac, and electricity.

Injection of morphine * by means of a Pravaz syringe is recommended before the fifth month. Two injections of 3 cgr. of hydrochlorate of morphine given at a week or a fortnight's interval will suffice.† It must not be forgotten that this method, seductive by its simplicity and its apparent harmlessness, may give rise to serious accidents: hæmorrhage, septicæmia, perforation of a loop of intestine.‡ Now in all cases in which it may be of service (commencement of pregnancy) laparotomy presents scarcely any danger in the hands of an experienced surgeon.

Electricity § has been employed in various ways: electro-puncture, galvanism, faradism, of which the latter alone appears to be used at the present day. The negative pole being applied in the neighbourhood of the ovum on the rectal or vaginal mucous membrane, the positive pole is applied over the abdominal wall, a few centimetres above the crural arch through the mediation of a plate of some conducting material. The current is passed for five or ten minutes and gradually increased in strength. For this the sensibility of the patient is taken as a guide, and the application is repeated as often as is deemed necessary.

* It was Joulin (Thesis, Paris 1863, and Complete treatise on midwifery, 1866, p. 967) who first proposed to kill the fœtus by injecting atropine or strychnine into the sac, through a capillary puncture.—Friedreich (Virchow's Arch., 1864, vol. 29, p. 312) first put the method into execution.—Koeberlé (cited by Keller, *loc. cit.*, p. 57) also resorted to this measure with success.—Fourrier of Compiègne (Bull. gén. de thérapeut., 1874, vol. 87, pp. 213, 271) wishing in this way to kill a fœtus of six months certainly killed it, but the cyst suppurated and induced metro-peritonitis; the woman succumbed to an abdominal section performed by Tarnier.—Maygrier (*loc. cit.*) in 1886 had collected six cases of it.

† Gossmann (Münchn. med. Woch., 1888, No. 50) relates a successful case with two injections, performed at an interval of fourteen days.—Winckel (Congress of Germ. gyn., Friburg, 1889, in Centr. f. Gyn., 1889, No. 29, p. 502) cured a woman by two injections within a week's interval, another case by a single injection. He knows nine undoubted successes by these means.—Veit (*ibid.*, No. 30, p. 516) admits the justifiability of this procedure.

‡ L. Meyer. Hosp. Tid., Copenhagen, 1888, No. 30, p. 745, and Zur operat. Behandlung der Extra-uterinschwang. (Zeitschr. f. Geb. u. Gyn., 1888, vol. 15, part 1, p. 147.)—A case of death from injection of morphine was published by Duncan in St. Barth. Hosp. Rep., 1883, vol. 19, pp. 27 and 44.

§ Bachetti of Pisa (Gaz. med. ital. feder. di Toscana, 1853, vol. 3, p. 137), at the instigation of Burci, was the first to resort to electro-puncture; the woman recovered, but the diagnosis was doubtful.

This method is still in great favour in America,* and seems also to have some ardent supporters in Russia.† It is very difficult to form a just idea of its efficacy, since all control over the exactness of diagnosis is impossible, and the greater number of the published cases are those of practitioners whose authority is not established.‡ It is far from being without its dangers. Beyond the fact that it provokes temporising in the face of a threatening lesion, it may itself induce tubal contractions and rupture. Brothers has found two cases of death, while Janvrin§ has cited yet another.

Extraction of the foetus with or without the sac by laparotomy or elytrotomy (vaginal incision) is, as I said at the commencement, the treatment that is more and more gaining ground for extra-uterine foetation at all periods of its evolution. In order to bring the indications into clear light, and to expose the peculiarities relating to different cases, it is absolutely necessary to divide them into categories.

1. *Extra-uterine foetation before the fifth month without rupture.*—As there are at this time no positive signs of pregnancy, it can only be suspected. But it is sufficient for a tumour of the appendages to be present occasioning pain for laparotomy to be indicated.|| The operation does not then present any notable difference from the removal of a serous, blood, or purulent tubal cyst. In the immense majority of cases, in point of fact, ectopic foetation is tubal, and this

* Garrigues (Trans. Amer. Gyn. Soc., Philad., 1883, vol. 7, p. 184) published eight cases of recovery that seemed to him to be indubitable; a large number have since been reported in the American journals.—A. Brothers (The treatment of extra-uterine pregnancy by electricity in Amer. Journ. of Obst., 1888, vol. 21, p. 474) has collected 43 more or less undoubted cases of ectopic pregnancy treated in this way, especially in America; he only discovered 2 deaths and 4 cases of serious accident.—Buckmaster (ibid., April, 1890, p. 337) has published, on the other hand, 42 cases of electrical treatment without any accident to the mother.

† At the Obst. and Gyn. Soc. of Moscow several cases of recovery have been cited; one by Kalabine; one by Warneck; two by Nedawetrky (anal. in Annal. de Gyn., Jan., 1890, vol. 33, p. 44).

‡ G. M. Tuttle (Four cases of extra-uterine pregnancy, in Amer. Journ. of Obst., Jan., 1890, vol. 23, p. 13) makes the same remark upon the worthlessness of statistics presented in America in favour of electricity.

§ Janvrin. Amer. Gyn. Soc., Sept. 1888 (anal. in Ann. de Gyn., Jan., 1889, vol. 31, p. 59). The patient died after three days of electrical treatment.

|| Veit (Zeitschr. f. Geb. u. Gyn., 1885, vol. 11, p. 384) is, it seems, the first surgeon who successfully performed early laparotomy (third month) for an extra-uterine foetation, and extirpated the tubal foetal cyst. Since then cases of this kind have been multiplied out of number.

frequency is so great that it has even led Lawson Tait* to deny the existence of the other varieties. A single point to be brought into relief in the method is the danger of hæmorrhage if the foetal cyst be ruptured during attempts at liberation. This accident, which has occasionally been fatal, has been noted on several occasions.†

If the sac be one for which a pedicle cannot be made, as in the case of intra-ligamentous or sub-peritoneo-pelvic foetation, which in some is only the development of a tubal foetation after the manner of an enclosed cyst, it must be shelled out by first of all incising the serous membrane at a spot where no vessels exist, and proceeding rapidly, large forceps being placed here and there. The profuse hæmorrhage coming from the placenta, even at this early period, is overcome by its immediate extraction.‡ Plugging of the peritoneum with iodoform gauze may here be of the greatest service.

Extirpation of foeto-cystic tubes chiefly during the first three months has very frequently been performed of late years; and the transactions of learned societies contain an ever-increasing number of examples. The operation is benign: Lawson Tait has had a series of 45 successful cases; Veit 12 recoveries out of 15 cases; and Zweifel § 8 recoveries out of 10 cases.

Elytrotomy has been performed in the first four months of extra-uterine foetation.|| It is then very inferior to laparotomy, for it does not give sufficient room to overcome the hæmorrhage which is to be feared.

2. *Extra-uterine foetation before the fifth month complicated by rupture and severe internal hæmorrhage.*—We may say that the

* Lawson Tait. *Lancet*, 1888, vol. 2, p. 409.

† Doléris. *Répert. univ. d'obst. et de gyn.*, 1889, p. 409.—Czempin. *Berlin Obst. and Gyn. Soc.*, Oct. 25, 1889 (*Centr. f. Gyn.*, 1889, p. 820).

‡ Czempin. *Ibid.*, June 28, 1889 (*Centr. f. Gyn.*, 1889, No. 31, p. 552).—It was a case of intra-ligamentous foetation of the fourth month with general adhesion to the cæcum and the small intestine.

§ Lawson Tait. *Loc. cit.*—J. Veit. *Verhandl. der deutschen Gesell. f. Gyn.*, in Friburg, 1889 (*Arch. f. Gyn.*, 1889, vol. 35, p. 512).—P. Zweifel. *Ueber Extra-uterin-gravidität, &c.* (*ibid.*, 1891, vol. 41, pp. 1 to 62).

|| G. Thomas (*Amer. Journ. of Obst.*, 1875, vol. 8, pp. 517, 522); pregnancy at the third month, serious hæmorrhage from wounding of the placenta; septicæmia; recovery.—O'Hara (*ibid.*, 1878, p. 525); pregnancy at the fourth month; hæmorrhage; death from peritonitis on the third day.—P. Zweifel (*loc. cit.*); 2 cases in the first half of pregnancy with 1 death from peritonitis.—Schauta (*loc. cit.*, p. 47) cites 3 cases of this kind with 1 death.

question of treatment to be adopted in such cases, though much discussed some years back, is not so now. When hæmorrhage threatens the life of a patient, the surgeon must go in search of the source of blood, whether the case be one of an external wound or of an internal rupture. To temporise, to count on spontaneous arrest, is in the large majority of cases to allow the woman to die, so as not to assume the responsibility of an operation which is a hundred times less serious than waiting. If she do not die immediately, she will die of a second or a third attack of hæmorrhage, or of the complications introduced by the enormous hæmatocele that is thus formed. The cases are very few and far between in which spontaneous recovery comes to justify the excessive prudence of the medical man.

Keller,* in 1872, boldly ventured to formulate this rule, while Lawson Tait† caused it to be adopted as a regular line of practice by a remarkable series of successful cases; out of 42 laparotomies he had 40 successful cases. It must be remarked, however, that in 12 only was he able to find the fœtus, but in the other cases discovery of placental remains rendered the diagnosis of ectopic foetation certain. Lawson Tait's example has been followed in America and in Germany. Schwarz‡ recommends in these cases careful removal of all the blood, not counting upon the absorbent power of the peritoneum when the hæmorrhage is profuse, and fearing rather the depressing effect of these masses of clot on the nervous system. If necessary, the peritoneal cavity should be hæmostatically plugged with iodoform gauze.§

3. *Extra-uterine foetation after the fifth month; child living.*—The fact that the child is living is of very great importance; but it has been differently estimated by writers. Some see therein especially the possibility of performing an operation which may save both the mother and child; others pre-occupy themselves exclusively with the mother and with the

* Keller. *Loc. cit.*, p. 59.

† L. Tait. *B.M.J.*, 1884, vol. 1, p. 1250, vol. 2, p. 817, *ibid.*, 1885, vol. 1, p. 778, and *Lectures on ectopic pregnancy*, Birm., 1888.

‡ Schwarz (*Verhandl. des 2ten Kongress der deutsch. Gesells. f. Gyn.*, 1889, p. 70) operated on a woman who was pulseless, and found 8 litres of blood in the peritoneal cavity; she recovered. The accident had occurred at the end of the second month.—The first operation of this kind performed in Germany was done by Frommel.

§ Picqué (cited by Regnaud, *Contrib. to the study of laparotomy in Extra-uterine pregnancy*. Thesis, Paris, 1891, p. 62) owed a success to this practice.

greater danger of intervening when the placental circulation is in full activity, and the fœtus is in their eyes a negligible quantity, for since, it has been said, it is often deformed, and rarely viable, its preservation ought not to count for much in the balance when it may compromise the maternal existence: * the latter alone ought to be considered.

The supporters of the primary operation, however, remark,† on the other hand, that if the operation performed after the death of the fœtus exposes less to the danger of hæmorrhage, it exposes more to that of septicæmia: the latter may rapidly develop before the two months necessary for the complete cessation of the placental circulation have elapsed, the object for which the expectant treatment was instituted, and the term which the attainment of that object requires.

Lastly, there is no doubt that the life of an ectopic fœtus has been held too cheaply. At the present time many cases are known of its perfect survival. If, therefore, we can succeed by improvements in methods in rendering the risk for the mother practically equal, whether the operation be performed before or after the death of the child, the first course will most certainly be the one to be preferred.

It must be confessed that the results were not up till the present time very encouraging. Maygrier‡ out of 17 cases that he has collected, counted, in 1886, 15 maternal deaths, which gives a mortality of 88·2 per cent; 10 times the mother died of hæmorrhage, either at the moment of incision because the placenta was adherent in front and had been implicated at the opening of the cyst, or else during the operation in consequence of stripping off the placenta, or else during the days following the operation when there had been spontaneous separation of fragments of placenta. With regard to the children, 9 died during the first fifty hours, and the fate of the 8 others was unknown.

* Litzmann. *Arch. f. Gyn.*, 1880, vol. 16, p. 323, *ibid.*, vol. 18, p. 1, and vol. 19, p. 96.—R. Harris. *Amer. Journ. of Obst.*, Nov., 1887, p. 1154, and *Amer. Journ. of the med. Sci.*, Aug., 1888, p. 262.—L. Meyer. *Zeitschr. f. Geb. u. Gyn.*, 1888, vol. 15, part 1, p. 147.—Werth. *Beiträge zur Anat., &c.*, Stuttgart, 1888.—Fraipont. *Brussels Obst. and Gyn. Soc.*, Oct. 20, 1889 (*Anal. in Centr. f. Gyn.*, 1889, No. 51, p. 897).

† Fränkel. *Breslauer ärztl. Zeitschr.*, 1882, No. 7, p. 78.

‡ Maygrier. *Terminations and treatment of extra-uterine pregnancy*. Thesis, Paris, 1886.

Confining himself to cases published from 1880 to 1886, Werth* found 8, in 7 of which the mother died while 3 children died; 2 more, however, succumbed soon after birth. On the other hand, 2 children were perfectly well when three months old.†

Harris‡ has more recently collected 30 cases of primary laparotomy, that is to say, performed before the death of the foetus, with the object of saving it as well as the mother. He found, before 1880, 20 cases with 1 success alone so far as the mother was concerned, and 10 (more or less lasting) for the child. From 1880 to 1888 he found 10 cases, out of which the mother was saved in 4, and the child in 6.

But since then the question has again taken on a different aspect. Here are the cases, most of them followed by success, published since the appearance of Werth's work in 1886: Lazarewicz,§ Breisky,|| Brühl,¶ John Williams,** Eastman,†† Olshausen,‡‡ Treub,§§ Lawson Tait||| (3 operations, 3

* Werth. *Loc. cit.*, p. 142.

† Normann. *Norsk Magaz. f. Loegevidenz*, 1880, vol. 10.—Netzel. *Hygiea*, April, 1881.

‡ R. Harris. Extra-uterine pregnancy treated by cystectomy (*Amer. Journ. of med. Sci.*, Sept., 1888, vol. 2, p. 262).

§ Lazarewicz, of Kharkoff (*Vratch*, St. Petersburg, 1886, vol. 7, pp. 76-115, anal. in *Répert. univ. d'Obst. et de Gyn.*, July, 1886, p. 277): complete extirpation of the sac; woman recovered; child lived 21 days.

|| Breisky. *Wien. med. Presse*, 1887, No. 48, p. 1650: operation for an eight months' intra-ligamentous tubal foetation; complete extraction of the sac and the placenta; rapid recovery of the mother; the child, perfectly viable, died three weeks later from phlebitis of the umbilical vein.

¶ L. Brühl, *Arch. f. Gyn.*, 1887, vol. 81, p. 404: the sac was stitched to the abdominal wall.

** John Williams. *Trans. Obst. Soc., Lond.*, 1887, p. 482: the sac was not removed, but was drained.

†† Eastman, of Indiana, *Amer. Journ. of Obst.*, Sept., 1888, vol. 21, p. 929: the case was one of eight months' intra-ligamentous pregnancy, without rupture of the tube; complete removal of the sac; flushing, drainage, recovery. The child was well formed and vigorous.

‡‡ Olshausen. *Deut. med. Woch.*, 1890, No. 9, p. 174: operation a fortnight before term. Tubal foetation, of which the sac had ruptured without hæmorrhage six days before, transformed into abdominal foetation; the child was free in the peritoneal cavity. Extirpation of the placenta and remains of sac. The child at 12 months weighed nearly 14 lbs. At the end of the year, second tubal foetation; rupture at the second month; laparotomy, recovery.

§§ Treub. *Zeitschr. f. Geb. u. Gyn.*, 1888, vol. 15, part 2, p. 884: ovarian or tubo-ovarian foetation operated upon three weeks before term; partial resection of the sac, strongly fixed to the abdominal wall; extraction of the placenta, plugging of the peritoneum with iodoform gauze, uninterrupted recovery; child living and growing well.

||| Lawson Tait. *Amer. Journ. of Obst.*, Mar. 1888, p. 289.

children and 2 women living), Carl Braun,* Rein,† and Lihotzky‡ have operated a little before term, or at term, and have saved mother and child. Champneys§ and Braun|| (in a second case) saved the child alone. Price¶ lost both mother and child, but he operated in the course of peritonitis caused by rupture of the sac; Hildebrandt** also in two cases operated upon women who were moribund, but nevertheless saved one child. G. Beisone†† lost the mother but saved the child. Schauta and Olshausen‡‡ (in a second case) saved the mother but the child soon died. Rochel§§ saved the mother but the child does not appear to have lived. Summing up, after subtraction, as is only fair, of Price's and Hildebrandt's cases, which were positively hopeless, we find out of 19 operations, 15 women living, and 17 children viable or having lived at least for several days.

These successes appear chiefly to be due to improvements introduced into the operative methods, and in particular to removal of the sac and the placenta. When reading these cases,

* Carl Braun. Obst. and Gyn. Soc. of Vienna, March 26, 1889 (Centr. f. Gyn., 1889, No. 36, p. 634): abdominal foetation; the placenta was fixed in Douglas' pouch, which was lined by a thick membrane, the only vestige of a sac, as were also the posterior surface of the uterus and the broad ligaments. Large vessels which ran from the hæmorrhage necessitated elastic ligature of the uterus, hysterectomy and plugging of the peritoneal cavity with iodoform gauze; the mother slowly recovered; the child died 12 hours after the operation from capillary bronchitis, attributed to inhalation of liquor amnii.

† G. E. Rein. Obst. and Gyn. Soc. of Kieff, Feb. 28, 1890 (anal. in Ann. in Gyn., Feb., 1892, p. 156): intra-ligamentous tubal foetation; operation at the tenth month; cyst very adherent; removal of the sac. The child is healthy and growing well.

‡ G. Lihotzky. Wien. Klin. Woch., 1891, p. 184: abdominal pregnancy at the seventh month; partial resection of the sac; complete removal of the placenta; suture of the rest of the sac to the abdominal wall; drainage. The child died on the second day.

§ Champneys. B.M.J., Dec. 3, 1887, vol. 2, p. 1213: operation at the seventh month of pregnancy; placenta left *in situ*; one month after, death from septicæmia.

|| Carl Braun. Arch. f. Gyn., 1890, vol. 37, p. 287: the sac was adherent to the abdominal wall; the placenta was removed, suture of the site of its insertion.

¶ Joseph Price. Case communicated to Harris, *loc. cit.*, p. 264; rupture of the sac; placenta, which was very adherent, was left *in situ*.

** Hildebrandt. Berl. klin. Woch., July 20, 1885, p. 465: in the first case the sac was left *in situ* and drained. In the second the placenta, which was very adherent, could not be removed.

†† G. Beisone. Gaz. med. di Torino, 1881, vol. 32, p. 553.

‡‡ Schauta, *loc. cit.*, p. 6: the sac was removed; the child only drew a few breaths. —Olshausen, *loc. cit.*, p. 171; operation 2½ weeks before term. Neither the sac nor the placenta could be removed. The latter was cut away after 34 days. The child only lived an hour and a half.

§§ Rochel (of Anvers). Brussels Gyn. and Obst. Soc. (anal. in Centr. f. Gyn., 1892, No. 7, p. 133): the sac was not removed but was treated by marsupialisation.

one sees here, as with any laparotomy, how one can overcome the difficulties of operation by decision and experience. Moreover, one appreciates the evident exaggeration of those who represent ectopic fœtuses as almost infallibly destined to die in consequence of deformities, or of congenital weakness. Moreover, even when this weakness exists, it is known that by means of incubators children may at the present day be reared who would formerly have been condemned. No longer therefore is hesitation necessary before performing primary laparotomy with the hope of saving the two lives. It is preferable not to wait for the onset of false labour, as Duncan and Reed recommended,* since then the fœtus succumbs very rapidly. As Fraenkel advises, the points to be considered in judging of the time for interference are gained by an external examination of the fœtus, by its size appreciable on palpation, and this should preferably be undertaken between the 35th and 37th weeks.

There remains the question of deciding which operation should be chosen for the extraction of the fœtus. As a general rule laparotomy is indicated, as it allows of our overcoming with much greater certainty the difficulties that may present themselves during operation. Nevertheless elytrotomy must not be proscribed. If on vaginal examination the placenta be not found, and the fœtus be deeply engaged in the pelvis, elytrotomy would even seem to be preferable as safeguarding against wound of the after-birth, which is probably inserted upon the anterior abdominal wall. This anatomical disposition would be certain if on auscultation here a blowing murmur were heard synchronous with the maternal pulse.†

At the actual time of false labour, the woman must be kept at absolute rest, and the pain must be combated by injections of morphia and enemata containing laudanum. An operation at this moment would be most untimely, unless symptoms of internal hæmorrhage supervene and force one's hand.

4. *Extra-uterine fœtation after the fifth month; child recently dead.*—Can one perform laparotomy in the first few days following upon death of the fœtus? Most European and American

* W. Duncan. *Lancet*, March 1, 1890, p. 449.—C. Reed, *Amer. Journ. of Obst.*, 1890, p. 185.

† Trachet. *Arch. de tocol.* Nov., 1888, p. 668.

surgeons and all French surgeons have hitherto answered this question in the negative.* Parry has gone so far as to recommend indefinite expectant treatment, and waiting either for the curative transformation into a lithopædion, or for accidents of spontaneous elimination which one would only have to assist. This doctrine has been adopted by Tarnier and Budin. Less absolute, Litzmann, Werth, Maygrier, and Pinard,† taking their stand on statistical results already old, and fearing the hæmorrhage which formerly killed so many of the patients who underwent operation, recommend waiting until the placental circulation has been obliterated. But the period of this obliteration is very doubtful; although it has approximately been fixed at two months, separation of the placenta has been known to give rise to terrific hæmorrhage at the end of three months.‡ The surgeon may therefore be deprived of all the advantages of a delay that has allowed the child to die, and has exposed the woman to fresh complications. Moreover, and this is a point on which it is necessary to insist, in the mortality of secondary operations—that is to say, those deferred of set purpose—it would be only fair to take into consideration those deaths which are the result of the expectant treatment itself, the cases of intercurrent septicæmia and peritonitis, which have made unhappy an interference that some months earlier presented itself under favourable conditions.

If one will only thoroughly weigh these considerations and consider the favourable results that have been yielded by the primary or early operation (laparotomy), in the cases latest published, one will be justified, I believe, in reversing the opinion formed upon it by my predecessors, and in adopting it as the rule. Here, as in almost all the problems of abdominal treatment, the theoretical objections of timorous surgeons fall before the brilliant results of bold practice backed up by efficient methods.§

* Among the first supporters of primary operation I must nevertheless mention Keller, Kiwisch, Schröder, Fränkel, and Hofmeier.

† Pinard. *Encyclop. Dict. of med. Sci.*, art. Extra-uterine pregnancy, 1886.

‡ Kirkley. *Amer. Journ. of Obstet.*, Feb., 1885, p. 160; death four hours after the operation.

§ The following are the statistical data upon which the supporters of complete abstention or of secondary operation take their stand; they are all of prior date to the magnificent successes obtained in the last few years by the primary operation, and I only give them because they have been published; Parry (*loc. cit.*) had found that of

The invasion of fever and the prodromata of septicæmia, far from contraindicating the operation, would render it more urgent. Patients have been saved under such circumstances.

5. *Extra-uterine foetation after the fifth month; child long dead.*—When the death of the foetus had occurred very long ago, when toleration appears to be established, when one may hope to see the fortunate transformation into a lithopædion, is it wise to interfere and to make the patient run the risks of a laparotomy when she is enjoying perfect health? I believe that even then an operation ought to be advised, in view of the future.* We must remember that toleration of an ectopic foetus is always precarious, that decomposition of the ovum and secondary infection of the peritoneum may supervene, so long as the lithopædion is not definitely formed, and that even then, though more rarely, infection followed by suppuration may cause the most serious accidents.

6. *Old suppurating foetal cyst, with or without fistula.*—It is very evident that in such a case our duty is to assist and hasten the work which is often but slowly carried out by nature. If there be an abscess, it must be opened, either through the abdominal walls,† or through the rectum, or through the vagina,

188 published cases left to nature 99 women had succumbed, giving a mortality of 52·6 per cent.; but according to Hutchinson (*Med. Times and Gaz.*, 1860, vol. 2, pp. 56, 77, 105, 132; *Lancet*, 1883, vol. 2, p. 71) out of 73 cases of retention of a dead foetus where there was no surgical interference, 18 women only died, which reduces the mortality to 24·6 per cent.—It is especially after these figures that Tarnier and Budin (*loc. cit.*, p. 566) “incline towards the expectant method.”

Maygrier (*loc. cit.*, p. 137) collected 70 cases of secondary operation (after the death of the foetus, second half of pregnancy); he found 25 deaths, or a mortality of 35·7 per cent. His table contains some very old cases that can scarcely be counted at the present day.

Werth (*loc. cit.*, p. 159), in a work published several months later than the preceding, gave a smaller series, reduced to operations performed from 1880 to 1886, and controlled with great care. Out of 53 cases thus collected (40 without extirpation of the sac, 11 with extirpation, 2 with fruitless attempts at extirpation) he found a mortality of 37·7 per cent.

* Schauta (*Beitr. zur Casuistik, &c.*, Prague, 1891, p. 43) out of 112 women with extra-uterine foetation after the fifth month, and treated expectantly, found 115 deaths (from 1876 to 1891), but on the other hand out of 121 women upon whom operations were performed only 19 died.

† Gastrotomy performed in such cases is not comparable with trans-peritoneal laparotomy performed with the object of evacuating or extirpating a foetal sac free in the abdomen. The former were the only cases that were successful in the hands of the older surgeons. The earliest was that of Primerose (1594), then comes that of F. Plater (1597), and a century later that of Calvo (1714). With regard to laparotomy properly so called, Levret had declared it to be too dangerous by reason of the

and search must be made for the site of the foetal remains. The surgeon will often be helped by the existence of a fistula which will allow of the penetration of a probe down to the tiny skeleton, and will serve as a guide for the incision. Such operations must not be compared with extraction of a foetus by laparotomy. They are really harmless if care be taken to afterwards treat the sac antiseptically, for as a rule it is greatly infected. I have had occasion to remove thus through the rectum the whole skeleton of a foetus of which spontaneous elimination was being attempted both through the rectum and the vagina. A large slough of the partition caused by the pressure of the sac had led to the formation of a considerable recto-vaginal fistula. The woman, who was one of Gallard's patients, recovered rapidly, thanks to regular antiseptic washing out of the abscess-cavity, which was extremely foetid. Out of 35 cases of old suppurating foetal cysts collected by Parry 3 only were followed by death.

7. *Fetation in a rudimentary horn of the uterus.*—Left to themselves, cases of this kind have given 23 deaths out of 30 cases in the first six months (Bandl). Laparotomy is therefore to be done without delay. The operation is infinitely simpler than in the preceding cases. It has been performed six times with only one failure, at term or long after it. The supplementary uterine horn was removed, as the whole uterus is removed in Porro's operation. A patient of Sänger's had two normal accouchements after the operation.*

Method of extraction of the foetus by laparotomy.—I have no

hæmorrhage; Banelocque, with more boldness, proposed it, but indicated the absolute necessity of leaving the placenta untouched, elimination of which should be entrusted to nature. But it was M'Knight (Trans. med. Soc. Lond., 1795, vol. 4, p. 342) who first performed it in the case of a dead foetus, and Heim (Horn's Arch., N. S., 1812 vol. 1, p. 1, and foll.) in that of a living foetus.

* The following are the cases in which a rudimentary horn of a gravid uterus has been removed. Koeberle (1865), Salin (1880), Werth and Litzmann (1881), Sänger (1882), Wiener (1885); one death, in Werth and Litzmann's case. In one only of these cases (that of Sänger) had the diagnosis been made previous to operation; in the other cases, extra-uterine fetation had been thought to be present.—Sänger. Centr. f. Gyn., 1883, p. 324.—M. Wiener. Arch. f. Gyn., 1885, vol. 26, p. 234.—Wyder, *ibid.*, 1890, vol. 37, p. 182.—L. Landau. Deut. med. Woch., 1890, p. 594.

MacDonald (Obst. Trans. Edinb., 1884—5, p. 76) has performed hysterectomy (Porro) successfully for a pregnancy developing in a rudimentary horn; the macerated foetus weighed five pounds; the case had been thought to be one of a fibroid. The patient recovered.

intention of describing here the whole operation, to which the rules are applicable that have already been given in the chapters on hysterectomy and ovariectomy; I shall only refer to some special and particularly difficult points.

Hæmorrhage is greatly to be feared when the pregnancy, being somewhat advanced, the child is living or has not long been dead. To guard against this danger we must commence by opening the sac, and taking great care not to wound the site of placental insertion. If an examination of its connections make it likely that complete removal of the sac will be extremely difficult, the idea must be forthwith abandoned, and the surgeon must content himself with stitching it to the abdominal wound with the precautions that will be indicated later on. All traction on the cord or the placenta must be avoided with the greatest care. The best method for overcoming the hæmorrhage that might arise is energetic plugging with iodoform gauze.

In any case it will be well to pack the sac loosely; and the tampons may be left *in situ* three or four days without fear of decomposition; if it be hæmorrhage that one be combatting they should not be removed before the eighth day.

Infection of the peritoneum by the contents of the foetal cyst is to be feared when the operation takes place after the death of the foetus, and when the patient has some fever indicative of septic intoxication.

The greatest pains must then be taken to remove the sac entire without opening it; if it have been impossible to avoid laceration, it is much better to abstain from all attempts at decortication, which then presents the greater danger of exposing a bleeding and raw surface to infection by the septic contents of the sac.*

A. *Preservation of the sac (marsupialisation).*—A method that may be recommended when one is certain of the difficulties presented by complete enucleation of the sac, without rupture, consists in plugging the wound right over the sac with iodoform gauze, and in opening the cyst on the third day, when it will have

* Certain circumstances may justify a particular line of conduct. Hofmeier (*Grundriss der gyn. Oper.*, 1888, p. 348) in a case of inflammation of the sac, which was full of pus and gas, and intense peritonitis, was obliged to remove the entire uterus, which formed a portion of the septic focus.—Another case of hysterectomy rendered necessary by the presence of tough adhesions has also been published; the pedicle was treated externally; death (Waitz, cited by Werth, *loc. cit.*, p. 159).

become united by adhesions to the abdominal wall. If the case be urgent, and if so long a delay be impossible, the surgeon before opening it should stitch it most carefully to the integument by a row of sutures, or more expeditiously by a continuous suture. When inserting the stitches to unite the sac to the abdominal wall, care must be taken not to penetrate into the interior of the sac, but to cause the needle to include only its superficial layers. When the sac has been opened, the foetus withdrawn by its feet, and the cord divided between two ligatures, the cavity is to be carefully washed out with 1 in 2,000 sublimate solution; Pinard, however, prefers to use a saturated solution of naphthol.* The fundus of the sac must be examined, and if it be close to the vaginal cul-de-sac, a cross-piece drainage-tube should be inserted, the long limb of which is to be passed into the posterior vaginal cul-de-sac. The placenta will be dried up by the application of a powder composed of tannic and salicylic acids, or by benzoate of soda.† Strips of iodoform gauze should be kept in the sac, and care must be taken that there is no accumulation of fluid in it. Recovery will take place slowly, by granulation; the placenta becomes detached in shreds.‡

Martin§ has applied to the treatment of the sac a method similar to that which he adopts after decortication of intra-ligamentous fibromata (fig. 170). He resected as much as possible of the cyst-wall, then stitched together what remained,

* Pinard (*Ann. de Gyn.*, April, 1889, vol. 31, p. 241, and *Sem. méd.*, 1891, p. 347) has reported 9 cases of extra-uterine foetation treated by marsupialisation, which he calls "exteriorisation of the sac," with one death for the mother; the children had always been dead for a longer or shorter time.

† Werth (*loc. cit.*) objects to the mixture of tannic and salicylic acids (Freund), on the ground that it prolongs the elimination of the placenta; he therefore prefers benzoate of soda.

‡ Negri (*Ann. di Ostet.*, March, 1885) has reported a case in which he completely reclosed the abdomen after having cleansed the cyst without extracting the placenta, which it was impossible to find. The patient recovered without any untoward symptoms.—Braithwaite (*Trans. Obst. Soc. Lond.*, 1886, vol. 27, p. 33) left *in situ* the placenta, which was extensively adherent to the fundus of the uterus and the neighbouring parts; drainage; recovery without expulsion of the after-birth.—These cases are curious and show the toleration for, and the possible absorption of these parts, but they cannot serve as a basis for any modification of the method of operation.

§ Martin. *Berl. klin. Woch.*, Dec. 19, 1881, p. 217.—To make sure of hæmostasis at the moment of extracting the placenta, he has also proposed to perforate its base at several places with strong needles, and to tie separately each of the segments thus circumscribed before removing it; this method is only applicable when the placenta is not inserted upon the viscera.

so as to isolate completely the interior of the sac from the peritoneal cavity; he provided for drainage through the vagina.

B. *Complete removal of the sac.*—This modification in the method of operation is of sufficient importance to merit a detailed description.

Treatment by suppuration of the sac, comparable with that of certain adherent ovarian cysts, presents the great disadvantage of being very tedious, of giving rise sometimes to a permanent fistula,* and of exposing the patient to the likelihood of subsequent hernia. Litzmann† therefore proposed the complete removal of the sac and its contents, foetus and placenta, in such a way as to be able to bring about rapid recovery, as after an operation for hæmato-salpinx or pyo-salpinx. This so-called “radical” operation at first did not give such good results as the “conservative” operation. Maygrier, in 1886, only knew 7 cases of removal of the sac. Werth out of 11 cases he had collected (in 1886) found 4 deaths and 7 recoveries, or 36 per cent., while out of 40 cases in which the sac had been left there were 14 deaths and 26 recoveries, or 35 per cent. But since then this operation has boldly been resorted to, and has given a series of remarkable successes, with a living child. In several of these cases there were extensive adhesions to the intestine, which, however, did not prevent recovery. Werth,‡ who has anew collected the cases of laparotomy for foetation at term published since 1887, has found that out of 9 operations, 1 alone had been performed without removal of the sac. This series only gave 2 deaths. I have myself succeeded in collecting a much larger number bearing upon the last three years, and therefore completing the series given by Maygrier and by Werth in his first great work. No doubt many cases have escaped my notice, yet nevertheless I have found 27 cases of extirpation of the sac (1887—1891) with 26 recoveries and 1 death. I have already cited a few pages back the 8 cases of Lazarewicz, Breisky, Eastman, Olshausen (in 1 case), Treub, Schauta, Rein, and Libotzky, which refer to operations for the extraction of living children. Here are some others, performed after the

* It has been known to persist for three years. (Rousseau. *Union méd. du Nord-Est*, Sept., 1877, p. 283.)

† Litzmann. *Arch. f. Gyn.*, 1882, vol. 19, part 1, p. 96.

‡ Werth, *Verhandl. der Versamml. der deutsch. Ges. f. Gyn. in Friburg*, 1889 (*Arch. f. Gyn.*, 1889, vol. 35, p. 513).

death of the fœtus at the end of pregnancy: Hofmeier* 1 case, death; Kusnetsky† 2 cases, recovery; Sutugin 2 cases, recovery; Muratow 1 case, recovery; Sajaïsky 2 cases, recovery; Kadjan 1 case, recovery; Slavjansky 1 case, recovery; Quénu‡ 1 case, recovery; Wiedow§ 1 case, recovery; Olshausen|| 3 cases, recovery; Matlakowski¶ 1 case, recovery; Rein** 1 case, recovery; Odenthal†† 1 case, recovery; Fantino‡‡ 1 case, recovery; Schauta§§ 1 case, recovery.

The method to be adopted in this procedure cannot be minutely given in detail. The operation as a whole closely resembles extirpation of an adherent ovarian cyst, or of a par-ovarian cyst enclosed between the layers of the broad ligament. This is the order of the principal stages:

1st Stage.—Abdominal incision, temporary suture of the sac to each of the lips of the wound.

2nd Stage.—Incision of the sac at its thinnest point, with avoidance of the vessels as far as possible, or securing them with artery forceps.

3rd Stage.—Seizure of the fœtus by the feet, extraction, ligature and section of the umbilical cord.

4th Stage.—Removal of the temporary stitches, extraction of the sac by breaking down adhesions, and decortication of the sub-serous portion; forceps must rapidly be placed on bleeding vessels, which, if necessary, the assistants may compress with their fingers.

5th Stage.—Permanent arrest of bleeding at the bottom of the wound by ligatures or by plugging with iodoform gauze.

* Hofmeier, cited by Falk, *Tubo-ovarial Schwangerschaft*, Inaug. Dissert., Berlin, 1887.

† Kusnetsky, Sutugin, Muratow, Sajaïsky, Kadjan, Slawiansky, cited by the last-mentioned: *Obst. and Gyn. Soc. of St. Petersburg*, Feb. 23, 1889 (anal. in *Centr. f. Gyn.*, 1889, p. 834). Kusnetsky's and Sutugin's cases are also mentioned in connection with Lazarewicz's case by Massalitinoff (*Répert. univ. d'obst. et de gyn.*, 1886, p. 227).

‡ Quénu. *Bull. et Mém. de la Soc. de chir.*, April 10, 1889, p. 318.

§ Wiedow. *Verhandl. des 3ten. Congress der deut. Ges. f. Gyn.*, Friburg, 1889 (*Centr. f. Gyn.*, 1889, No. 29, p. 502).

|| Olshausen. *Ueber Extra-uterinschwangerschaft*, &c. (*Dent. med. Woch.*, 1890, No. 9, p. 173, and No. 10, pp. 192, 193).

¶ Matlakowski. *Arch. f. Gyn.*, 1890, vol. 38, p. 367.

** Rein. *Obst. and Gyn. Soc. of Kieff*, 1890 (*Répert. univ. d'Obst. et de Gyn.*, 1891, p. 421).

†† Odenthal. *Obst. Soc. of Leipzig*, Dec. 15, 1890 (*Centr. f. Gyn.*, 1891, p. 239).

‡‡ Fantino (of Turin), *Riv. di Ost. e gin.*, 1891, No. 7.

§§ Schauta, *loc. cit.*, p. 6.

Even when plugging is not going to be adopted, it will be prudent not to completely reclose the abdominal wound, but to provide for drainage at its lower end, either by means of a gutta-percha tube or of a few strips of antiseptic gauze.

If the sac adhere too firmly to the bowel it must only be resected close around the adhesions, while the wound must be kept plugged from the bottom—the tampons being changed when necessary—until the portions of the cyst-wall left *in situ* have sloughed away (Treub).

Method of extracting the fœtus by elytrotomy.—Incision of the vagina, less formidable in appearance than laparotomy, has been recommended by Baudelocque, who,* however, had not the slightest fear about recommending the abdominal operation.†

Maygrier (1886) has found 4 cases of elytrotomy in the second half of pregnancy, the child being living. There were two recoveries (1 doubtful) and 2 deaths, or 50 per cent. The same operation, the fœtus being dead, gave 7 recoveries and 5 deaths, or a mortality of 41·6 per cent.‡ Schauta§ has collected, from 1876 to 1891, 12 cases of elytrotomy, of which 5 were during the last four months of pregnancy and 7 after term. These cases divide themselves in the following manner: out of the 5 first cases the placenta was abandoned in 3 (1 death); twice the placenta was removed, in 1 case with a living child, and the patient recovered; the other patient died. Of the 7 cases of elytrotomy after term 3 were followed by death; once only the placenta had been removed.

This operation, it seems to me, ought to be reserved for cases in which the fœtus is dead.¶ We cannot in the almost complete

* Baudelocque. The art of midwifery, Paris, 1815, vol. 2, p. 488.

† The first elytrotomy seems to have been performed in America by John King (Med. Repository, New York, 1818, p. 388, pointed out by Parry, *loc. cit.*, p. 258) for a child at term which was saved as well as its mother. This case is doubtful.—Caignon (Lancette franc., 1829, p. 155) published a case of foetation in the abdominal extremity of the left tube; “peculiar” operation (elytrotomy). The fœtus aged six-and-a-half months was extracted alive.—Two years before, Norman (Trans. Roy. Med. Chir. Soc. Lond., 1827, vol. 18, p. 348) had made known a case of elytrotomy for a dead fœtus.

‡ Maygrier (*loc. cit.*) gives by mistake the per centage as 38·5.

§ Schauta, *loc. cit.*, p. 47.

¶ Landau (cited by Fenger, Amer. Journ. of Obst., 1891, p. 484) has it seems performed elytrotomy 13 times with only one death. But the cases not having been published in detail it is impossible to say whether they were extra-uterine foetations in the first or second half of pregnancy.

absence of cases* reckon the danger of the operation in the case of a living child. But *à priori* the probability is that it would be very considerable in spite of the slight hæmorrhage. Laparotomy can be far better controlled.

It is quite otherwise when the fœtus is dead. It is then necessary before thinking of elytrotomy to make sure that the cyst will present at the incision, that the placenta will run no danger, and that the bladder and uterus are displaced to one side. Nevertheless the first condition alone is the only indispensable one, for the presence of the placenta in the vaginal cul-de-sac will not present any serious danger after about two months have elapsed, the period necessary for the cessation of the fœtal circulation.

The following is the method adopted with success by Pinard † in an elytrotomy for an extra-uterine fœtation at the sixth month: anæsthesia, woman placed in the obstetrical position; examination of the vaginal cul-de-sac, and puncture with a knife at a spot where the absence of arterial pulsation has been made out. Introduction of the finger into this button-hole for exploration, then enlargement by tearing and dilating in various directions by means of the fingers gathered together into a cone. After the hand has effected an entrance, a foot is seized and drawn down to the vulva by slow and continuous traction, then the breech and the trunk are engaged; the two arms are successively disengaged, and afterwards the head.‡ The cord is divided and the surgeon goes in search of the placenta. Is it easy to remove it? It is gently stripped off with the fingers, but if it seem in the least degree adherent it is preferable to abandon it. The interior of the cyst is then abundantly flushed with a 1 in 5,000 solution of sublimate, or with a saturated watery solution of naphthol β . I am inclined to think that the introduction of iodoform gauze would then be preferable to the frequent injections recommended by Pinard. The gauze should be renewed every three or four days,

* The only incontestable case of elytrotomy followed by the extraction of a viable child is that of Mathieson (Trans. Obst. Soc. Lond., 1885, vol. 26, p. 132) communicated by McCallum.—This is the case of which Schauta speaks in his statistical paper (*loc. cit.*).

† A. Pinard. The history of extra-uterine pregnancy (Ann. de Gyn., April, 1889, vol. 31, p. 246) and Semaine méd., 1891, p. 347.

‡ Exceptionally, forceps may be necessary for the delivery of the head, if it be very firmly fixed. Cf. Olshausen, Verhandl., &c., p. 516.

and it might even be left *in situ* for a longer period. If symptoms of putrid infection arise by reason of insufficient antiseptics,* continuous irrigation may be resorted to, since it has yielded such satisfactory results in puerperal septicæmia.†

Spontaneous elimination of the suppurating sac through the bladder is very rare, and Winckel‡ has only been able to find twelve recorded cases of it. In such cases laparotomy, vaginal cystotomy (P. Müller),§ elytrotomy, and the supra-pubic operation || have successively been tried.

These operations may generally be avoided; it is sufficient to dilate the urethra (Winckel), or if necessary to notch it (Littlewood),¶ when the index finger can be introduced in search of the orifice of the sac and enlarge it, and the foetal bones can be extracted with forceps, after which the sac can be washed out with injections. It is only if this cannot be accomplished, or if serious symptoms demand active interference, that vaginal cystotomy followed immediately after evacuation and disinfection of the sac should be performed. The operation through a dilated urethra may moreover be carried out at two or three sittings, if cocain be used. Injections of boric acid into the bladder should be continued until all traces of cystitis have disappeared.

Possibly in some definite cases in which a large cyst is incarcerated firmly in Douglas' pouch, to elytrotomy might be preferred perineotomy, either transverse or vertical, or a parasacral incision, or even one might resort to an operation through the pelvis after preliminary resection of the coccyx and a portion of the sacrum. It is for the future to decide upon the precise indications for these hitherto novel operations.

* Dorff (Belg. Soc. for Gyn. and Obst., Oct. 20, 1889, anal. in Ann. de Gyn., Jan., 1890, vol. 33, p. 60) saw one of Kaltenbach's patients succumb on the ninth day in consequence of the difficulties of vaginal antiseptics.—Barsony (Centr. f. Gyn., 1889, No. 22, p. 385) has also seen a fatal case.—Pinard (*loc. cit.*) has published a most successful case.

† Pinard and Varnier. Ann. de Gyn., Dec. 1885, vol. 24, p. 454, and April, 1889, vol. 31, p. 241.

‡ F. Winckel. Ueber den Durchbruch extra-uteriner Fruchtsäcke in die Blase (Sammi. klin. Vorträge, May, 1890, No. 8).

§ P. Müller. Arch. f. Gyn., 1887, vol. 30, p. 78.

|| Werth. Beiträge, &c., 1877, p. 126 (case V).

¶ Littlewood. Lancet, April 3, 1886, vol. 1, p. 637.

BOOK XIV.

DISEASES OF THE VAGINA.

CHAPTER I.

VAGINITIS.

Pathogenesis. Ætiology. Micro-organisms of vaginitis: Neisser's gonococcus, &c. Clinical varieties; specific vaginitis of adults; vaginitis of young girls and virgins; vaginitis of pregnant women; vaginitis of the climacteric.—*Pathological anatomy. Granular vaginitis. Simple vaginitis. Senile vaginitis. Vulvo-vaginal leucoplasia. Emphysematous vaginitis (cystic pachyvaginitis).*—*Symptoms. Vegetations. Exfoliative vaginitis.*—*Diagnosis.*—*Prognosis.*—*Treatment. Pseudo-vaginitis. Croupous or diphtheritic vaginitis; gangrenous vaginitis; dissecting phlegmonous peri-vaginitis.*

Pathogenesis. Ætiology.—The mucous coat which covers the vagina, like all those in immediate contact with the external air, is a dermo-papillary mucous membrane, which offers a great similarity to the external integument from its close network and its stratified epithelial layer. But it is distinguished therefrom by the absence of the impermeable varnish which is formed on the skin by the cornified layer of the epidermis. The constant shedding of epithelial cells, incessantly renewed on its surface, alone protects it from the irritating action of external agents. Nevertheless it is difficult to understand how the mucous membrane resists the action of the numerous micro-organisms that flourish within the vagina. Evidently there must here come in the newly acquired pathogenetic ideas upon the receptivity of the tissues from the point of view of infection.* The vagina is normally inhabited by indifferent

* The action is the same of the pneumococcus in pneumonia, the importance of which was discovered by Fränkel, Friedländer, and Talamon. Now Netter has shown that this micro-organism is almost normal in the saliva, in the nasal mucus, &c., of persons who have never suffered from pneumonia. If any injury or chill put the patient into a condition of morbid receptivity, the pneumococcus emigrates in a few hours, and forms colonies in the lungs (F. Foveau. On vaginitis and its treatment, Thesis, Paris, 1888, p. 21).

micro-organisms, of which some are pathogenic, although they are attenuated and harmless (Winter). It receives morbid germs, which come in greater or lesser numbers from without by the simple entry of air, by coitus, by injections, &c. Inoculation, however, does not occur except under determinate conditions which allow the germs to acquire, to recuperate, or to manifest their virulence by creating for them, so to speak, a favourable cultivation bouillon. "Irritation" in the sense in which it was understood by old writers is here quite insufficient. Thus the actual cautery, or the use of a powerful caustic, will only cause the formation of a localised eschar without any inflammation propagated to the rest of the canal, provided that stagnation of fluids be prevented by the use of detersive injections; while the same lesion, or the presence of a foreign body of itself aseptic, such as a pessary, will be enough to lead to the development of an intense vaginitis, if cleanliness be not carefully undertaken and so the multiplication of micro-organisms be prevented.

These considerations are of prime importance from the point of view of the pathogenesis of vaginitis. They explain the pre-disposing influence of menstruation and of parturition, which act especially by the possible stagnation and decomposition of the secretions which are the result of them.

Gonorrhœal infection comes in the first line in the ætiology of vaginitis because of the obstinacy of the inflammation to which it gives rise, and the serious consequences that may arise from its extension to other parts.

Since Neisser's discovery * it has been known that the pathogenic micro-organism of this affection is a special coccus, which has been called the "gonococcus" (fig. 380). It is found in the form of rounded or oval grains like grains of coffee, sometimes joined by their flat surface, and taking on the shape of the figure 8. Collected into groups of from ten to twenty they form colonies encapsuled in a single hyaline envelope. Affixed to pus-cells, or more rarely to epithelial cells, according to Neisser

* Neisser. Ueber eine Gonorrh. eigen. Mikroccoccusform (Centr. f. med. Wissenach, 1879, No. 28, p. 497).—As precursors of Neisser, who suspected but did not demonstrate the existence of parasites in gonorrhœal pus, must be cited Donné (1844), Jousseume (1862), Hallier (1872), Salisbury (1873), Bouchard (1878).—Cf. on this subject, Du Castel. Acute Gonorrhœa (lecture published by l'Union med., Aug. 21, 1888, vol. 46, p. 241)

they are capable of penetrating into them and multiplying, contrary to what occurs with all varieties of the same shape from which this fact serves to distinguish them. This last assertion has been contradicted by Stekhoven.* Gonococci penetrate into epithelium the more easily the more its cells

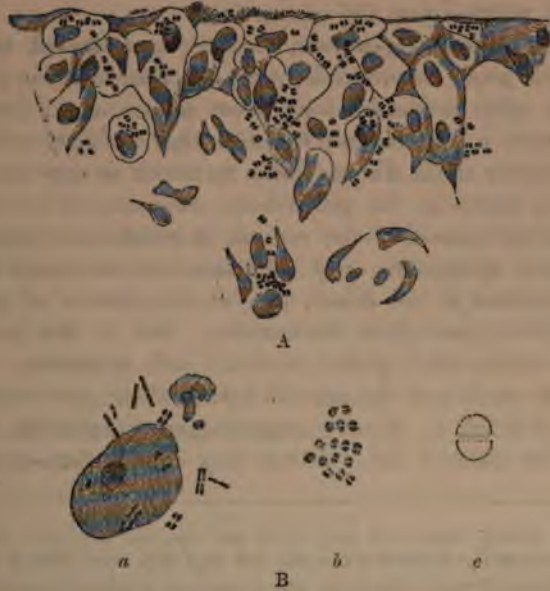


Fig. 380.—The gonococcus of Neisser.

- A. Section of the palpebral conjunctiva in a case of blennorrhagic ophthalmia of three days' duration; migration of gonococci across the epithelial lining and invasion of the sub-epithelial tissue by small collections of germs (Bumm).
- B. Preparation of the vaginal secretion of a puerperal woman; *a*, epithelial cell and pus cell, on the surface of and around which are seen bacilli and gonococci; *b*, pure cultivation of gonococcus; *c*, diagram of the diplococcus (gonococcus) of gonorrhœa (Bumm).

have been previously separated by the multiplication of pus-cells.

These micro-organisms can be stained by methyl-violet or by fuchsin.†

* J. H. Stekhoven. *Der Neisser'sche Gonococcus* (Deut. med. Woch., 1888, No. 35, p. 717). He asserts that he has proved the presence of micro-organisms in the interior of leucocytes in many processes which have nothing to do with gonorrhœa.

† Bumm (Arch. f. Gyn., 1884, vol. 23, p. 327, and *Der Mikro-organismus der gonorrhœischen Schleimhautrekrankungen*, Wiesbaden, 1884), gives the following

Bumm asserts that the invasion of the gonococcus never occurs primarily by the vagina, but that it takes up its situation in the cervix, or, more rarely, in the urethra, where there is a less resistant epithelium, and particularly in the cervix, where this covering is cylindrical.* According to Steinschneider† and Fabry‡ the urethra is, on the contrary, more frequently affected than the cervix.

The part played by gonococci was long uncontested, and the cases which prove its preponderating influence seem in point of fact to be quite demonstrative. Most numerous in the acute period, rarer in the chronic varieties, they multiply or become scarcer exactly as the disease lights up afresh or dies out; they have been found in the gonorrhœal secretions of the urethra, of Bartholin's glands, of the rectum, in gonorrhœal salpingitis, in purulent ophthalmia, and they have even been said to have been discovered in the blood, and in the synovia of patients suffering from gonorrhœal rheumatism. But to this period of certainty succeeded a period of doubt and scepticism. Some went so far as to deny the specific nature of the gonococcus, the likeness of which to other, non-pathogenic, diplococci Bumm himself has pointed out. Were they these micro-organisms

method for finding them—it is very rapid, and does not take more than three minutes: the secretion is spread out on the slide in a thin layer, dried at the flame of a spirit lamp, allowed to remain for half a minute to a minute in a concentrated watery solution of fuchsin, wiped, dried again in the flame, and is immediately examined with an immersion lens.

* Eraud (Lyon méd., July 22, 1888, vol. 58, p. 481, and Province méd., Nov. 9, 1888) has made some researches that confirm this assertion. In 200 women with gonorrhœa he examined the urethral, the vaginal, and the uterine secretions. He only very rarely found gonococci in the vagina, but frequently in the cervix uteri.

† Steinschneider. Berl. klin. Woch., 1887, No. 17, p. 301.—The following is the result of his examination of 57 prostitutes: 1. In all cases of gonorrhœa, the urethra is the part most frequently affected (47 per 100); then comes the cervical mucous membrane, then the uterine mucous membrane, and Bartholin's glands. 2. In all recent cases of vaginal gonorrhœa there also exists a urethritis and gonococci are always found in the latter, however scanty be the urethral discharge. 3. Long after gonococci have disappeared from the urethra, they may be found in the cervix or in the body of the uterus, even when they do not manifest their presence by any morbid phenomena. 4. The mucous membrane of the vulva and the vagina is inimical to the multiplication of gonococci. If they be found in the vaginal secretion it is because they have migrated from neighbouring parts. This immunity is due, probably, to the thick pavement epithelial lining, to the acidity of the secretion, and lastly to the struggle for existence between the numerous micro-organisms which normally inhabit the vagina and crowd out the gonococcus.

‡ Fabry. Deut. med. Woch., 1888, No. 48, p. 876.

themselves, or were they, so to speak, pseudo-gonococci which were found by Eklund in ulcerations in the intestines, the lungs, and the mouth, by Amicis, in simple experimental urethritis, by Sternberg in the urine, which he considers as their normal dwelling-place (micro-coccus ureæ)? Is the gonococcus henceforth to be regarded only as an indifferent saprophyte capable of becoming pathogenic under certain conditions? Or are we to allow that, though it constitutes a distinct variety having definite pathogenic properties, it can become attenuated and preserve its injurious properties in a latent state until they find themselves in a suitable environment? This seems the most probable hypothesis. Be that as it may, direct experiments instituted with the object of settling the question by cultures and inoculation have given no convincing results; sometimes they have succeeded in communicating gonorrhœa, but generally they have been without effect.* Beyond the presence of the micro-organism itself, we have therefore to bear in mind other factors which may be dimly imagined even now, but which have not been fully studied.

The pathogenic micro-organisms of suppuration and of putrefaction also give rise to vaginitis if circumstances lend themselves thereto, that is to say, if they penetrate into the generative tract in sufficient numbers to escape there the causes of destruction, and if they find themselves in a suitable medium in consequence of the stagnation of the secretions. These germs may come from without; gaping of the vulva, weakened by an incomplete rupture of the perinæum, favours their access; an opposite condition, the presence of a hymen with a small orifice, may have a similar effect by another mechanism, viz., that of retaining the secretions and opposing the exit of the menstrual blood by a kind of retro-hymeneal cul-de-sac; this is the predisposing cause of the non-specific vaginitis of little girls and of virgins, to which masturbation

* Neisser, Leistikow, Krause, Löffler, Bouchard, Kreise, Burner, and Crivelli have never been able to produce gonorrhœa by inoculation of the liquids of pure cultivations (Crivelli. *Nature and treatment of gonorrhœa*. Thesis, Paris, 1886). On the other hand, Bokai, Filkenstein, C. Paul, and Bockhardt have developed urethritis by inoculation, and the last-mentioned has even produced cystitis and multiple abscesses of the kidneys in a moribund general paralytic (Du Castel, *loc. cit.*).—H. Poney (Researches on the microbe of gonorrhœal pus. Thesis, Paris, 1888) only had one positive result out of six inoculations.

sometimes adds the influence of a direct inoculation. Inflammations of the vulva of diverse natures, erythema, exanthema, may also bring about this contamination; thread-worms coming from the rectum are frequently the intermediaries of this infection. I only mention contamination transmitted from the bladder to the rectum by fistulæ, as they form exceptional causes. But a fairly common and often unrecognised cause is secondary infection of the vagina by pathological secretions which have come from the uterus; the vaginal leucorrhœa that complicates metritis has the same origin, and it is seen to diminish as soon as the inflammation of the mucous membrane has been cured by curettage or by any other effective medication.

Local irritation and hyperæmia are not sufficient of themselves for the production of vaginitis, but they allow of its rapid development by favouring the action of micro-organisms, indigenous or foreign. It is in this way that masturbation, even without the introduction of a foreign body, acts, as also the prolonged stay of pessaries in the absence of sufficient care of cleanliness, blood-stasis from cardiac or hepatic disease, the pressure of abdominal tumours, and pregnancy. Bumm has made, with reference to this last, the curious remark that it produces an excessive proliferation of gonococci even when the gonorrhœal infection seems long before to have died out. It is also by reason of the congestion of the generative organs that occurs at the menopause that it sometimes leads to vaginitis; the same is true of exposure to cold, excessive coitus, the use of sewing-machines, horse-riding, &c.

From a purely clinical point of view, a certain number of varieties of vaginitis may be distinguished.

1. *Gonorrhœal vaginitis of adults*, which is by far the commonest form, and which may affect young girls and virgins in whom the real cause is generally unknown.*

* Ollivier (Note on the contagion of vulvo-vaginitis in young girls, in Bull. de l'Acad. de méd., 1888, vol. 20, No. 13, p. 561) saw at l'hôpital de l'Enfant-Jésus an epidemic which ceased under antiseptic treatment. It is very probable that the infection was gonorrhœal.—Von Dusch (Ueber die infectiöse Kolpitis kleiner Mädchen in Deut. med. Woch., 1888, No. 41, p. 831) has seen many cases of it at the hospital of Heidelberg. In half the cases he found, on careful inquiry, that contagion had come from parents, brothers, or sisters; "household epidemics" own this cause only.—F. Späth (Münch. med. Woch., May 28, 1889, p. 373), out of 21 cases of vaginitis of young girls found Neisser's gonococcus in 14. In none of the other 7

2. *The vaginitis of young girls and of virgins* may be the result of some unknown gonorrhœal infection, as I have just said; then the vagina has, as a rule, been put into a condition of increased "receptivity" by one of the exanthems, measles, scarlatina, &c., which has enfeebled the whole organism and led to desquamation of epithelium.*

But there is a non-specific vaginitis probably due to the development of simple saprophytes in weakened children, or in those for whom the hygienic arrangements are defective; I have indicated the eventual part played by thread-worms in little girls, and by smallness of the hymeneal orifice in them and in virgins. It constitutes an organic predisposition similar to that of congenital phimosis in the production of balanitis in the male sex.

3. *The vaginitis of pregnant women* is sometimes only the re-awakening of an old gonorrhœa; but it may also be non-specific and nevertheless give rise to extreme symptoms, vegetations, discharge, &c. No doubt it then is a case of infection by staphylococci or streptococci.

With regard to the septic vaginitis of lying-in women, it does not constitute a definite morbid variety; it is a simple local manifestation of the general infection translating itself here, as elsewhere, into a tendency towards suppuration and sloughing; frequently there is a mixed puerpero-gonorrhœal infection.

4. *The vaginitis of the menopause and of old women*, generally takes on an anatomical form, which converts it into a somewhat special affection. Its production can generally be explained by

was there urethritis. He satisfied himself that contagion had occurred at home or in the hospital by the linen, clothing, &c.—Pott, of Halle (Gyn. Congress at Halle in Centr. f. Gyn., 1888, No. 26, p. 422), had observed in 12 years 86 cases of vulvo-vaginitis, out of a total of 8,481 young girls that he had examined; that is to say, before 5 years, 56 cases; from 5 to 10 years, 28 cases; from 10 to 15 years, 7 cases. The affection was gonorrhœal, for examination by Cseri and Israel showed the presence of gonococci. He does not believe that inoculation from rape is common, but that it is rather due to contamination by the bed-clothes, when the children sleep with the parents and elder brothers; this inoculation is much easier with young girls than with young boys.—Prochownik (ibid., p. 423), out of 21 cases of gonorrhœa in young girls, found the gonococcus 17 times.

* Dusch (*loc. cit.*) expressly notes that the young girls most liable to be infected are those who have had scarlatina.—F. Späth (*loc. cit.*) makes the same remark. What then constitutes the proof that the affection is gonorrhœal is the presence of the gonococcus in the accompanying urethritis.

the absence of ordinary hygienic precautions and a diathetic predisposition (herpetism).

Pathological anatomy.—It is rare for the vaginal canal to be affected in its whole course; that may, however, be observed in the acute stage of an inflammation induced by a recent gonorrhœa, by an exanthem, or by a strong local irritation (caustic injection, traumatism). The whole of the mucous membrane is then found to be swollen, red, and covered with muco-pus. Generally the vaginal inflammation proceeds in islands or in plaques. Area of disease are seen alternating with healthy area. C. Ruge* has distinguished three varieties of vaginitis from the point of view of pathological anatomy: (1) granular vaginitis; (2) simple vaginitis; (3) senile vaginitis, or the vaginitis of old women. To these may be added (4)



Fig. 881.—Granular vaginitis (Ruge).

emphysematous vaginitis, a rare condition, but one of which a morbid entity separate from the class of vaginites cannot be made.

1. *Granular vaginitis.*—This is the commonest form: it is seen both in acute and in chronic cases. The epithelial covering is thickened, especially in its deeper layers, which take staining reagents more readily. The papillæ are hypertrophied, infiltrated with small cells, and, by the disappearance of the spaces that separate them, end in becoming fused and in forming small masses which make up the granulations. The epithelium covering then may become thin and take on a granular appearance, which leads to its confusion with the tissue of the granulation itself. One would then be led to believe that there

* C. Ruge. *Zeitschr. f. Geb. u. Gyn.*, 1879, vol. 4, p. 135.

was a formation of follicles, while really there have only supervened changes in the papillæ and in the epithelial covering, with increase of the capillary network.

2. *Simple vaginitis*.—The epithelial surface remains smooth, but is thickened in places; at the spots where it is thinnest the papillæ are swollen and the subjacent tissue is infiltrated with small cells. But the infiltration is limited to the epithelial layer, so that simple vaginitis is distinguished from granular vaginitis by the lesser degree to which this occurs (fig. 382).

3. *Senile vaginitis (colpitis vetularum)*.—Spots of various sizes project on the surface of the mucous membrane and become fused in certain places. They differ in structure; sometimes they are kinds of ecchymoses, sometimes flattened projections that present a point of softening at their centre; the epithelial covering is thinned greatly or completely destroyed, which allows of the formation of adhesions that may obliterate the vagina.



Fig. 382.—Simple vaginitis (Ruge).

The "miliary or vesicular" vaginitis described by Eppinger* seems to belong to this variety, as does the "adhesive ulcerating vaginitis" of Hildebrandt.† It is probable that to it must also be allied that which has been described as "leucoplasia"‡ of the vaginal mucous membrane. All the cases cited in support of this new morbid variety have in point of fact occurred in old women, and from the descriptions of the lesions they do not greatly differ from those described by Ruge; it is only very hypothetically, and in consequence of a very doubtful external

* H. Eppinger. *Zeitschr. f. Heilkunde*, 1880, vol. 1, p. 369, and 1882, vol. 3, p. 177.

† H. Hildebrandt. *Monatschr. f. Geb.*, 1868, vol. 32, p. 128 and foll.

‡ P. Reclus. *Cancroid developing on the plates of leucoplasia vaginalis* (*Gaz. hebdomad. de méd.*, July 1, 1887).—Gabriel Bax. *Leucoplasia and cancrroid of the vulvo-vaginal mucous membrane*. Thesis, Paris, 1887.—Among the 6 cases reported in this thesis the first and second are simple vulvar epithelioma; the third, fourth, and fifth are cases of epithelioma coinciding with plaques of vaginitis; the sixth, a typical case of senile vaginitis in a diabetic patient. All these women had passed the menopause.

similarity of appearance, that they have been allied to buccal psoriasis.

4. *Emphysematous vaginitis, or cystic pachyvaginitis*—I have pointed out above the inflammatory swelling that the vaginal mucous membrane sometimes undergoes during pregnancy.* The prominences, separated by furrows seen in these cases, have been compared by Winckel to those of grains of maize in the ear. They may hollow out for themselves lacunæ, enclosing liquid or gases. This variety is very rare in the absence of pregnancy; it has been called "cystic colpo-hyperplasia" (Winckel). Since the gas does not occur in true cystic cavities, but rather in the meshwork of the connective tissue (C. Ruge), it is better to call it "emphysematous" vaginitis. It is probable that the gases are formed *in situ* and follow upon the molecular disintegration of the inflammatory proliferation tissue, although this origin has still to be demonstrated. Chiari has asserted that the gases are formed in the enlarged capillaries of the lymphatic system filled with swollen endothelium. These vesicles may rupture and become transformed momentarily into small ulcerations, or dry up in the shape of scales.

Symptoms.—At the commencement, if the vaginitis results from gonorrhœal infection or from external violence, sharp localised pain may mark the invasion of the disease. To this there is soon added leucorrhœa, at first serous, then greenish-white, puriform, or simply purulent. It may be very abundant, give rise to most painful vulvar pruritus, and become a cause of enfeeblement.

When the acute stage has passed, the discharge is much less abundant, and sometimes one is obliged to search for traces of it in the vaginal culs-de-sac, which form a kind of natural lurking-place where traces of old inflammation are long to be found; this fact has led to the formation of the name of "gonorrhœa of the culs-de-sac" (Alph. Guérin, Martineau).

* Consult on vaginitis during pregnancy, and on this variety in particular: F. Winckel, *Arch. f. Gyn.*, 1871, vol. 2, p. 405.—Schröder. *Deut. Arch. f. klin. Med.*, 1874, p. 538.—M. Schmolling. *Ueber Colpolyhyperplasia cystica und Luftcysten der Scheide*. Inaug. Dissert., Berlin, 1875.—P. Nücke. *Arch. f. Gyn.*, 1876, vol. 9, p. 461.—E. Chenevière. *Ibid.*, 1877, vol. 11, p. 351.—Zweifel. *Ibid.*, vol. 12, p. 39.—C. Ruge. *Zeitschr. f. Geb. und Gyn.*, 1878, vol. 2, p. 29.—Eppinger, *loc. cit.*, p. 369.—Hückel. *Virchow's Arch.*, 1883, vol. 93, part 2, p. 204.—H. Chiari. *Prag. Zeitschr. f. Heilk.*, 1885, vol. 6, p. 81.

The small glands situated in the neighbourhood of the meatus urinarius may also long remain infected. Gonorrhœal infection of the vulva and of its glands never of itself leads to swelling of the inguinal glands.*

Specular examination should preferably be performed with a Cusco's speculum, which allows of wide separation of the walls, and of their being seen between its half-opened blades.

Digital examination will give us information upon the granular and rugose condition of the vagina. It is hot and tender in the acute stage.

In gonorrhœal vaginitis there always exists at the same time some urethritis. To find it, the woman must be examined before passing water, and the urethra should be pressed from above downwards so as to squeeze out of the meatus any drop of pus that it may contain.

The general health is often affected by intense leucorrhœa; there occur in particular very painful gastralgic disorders and a passing febrile state, coming on in acute or sub-acute attacks; they are due to the salpingitis with serous peri-salpingitis, which Nöggerath has described in such cases under the name of "recurrent parametritis."

Senile vaginitis often is unaccompanied by any symptoms, or only by a little serous or sanguinolent leucorrhœa (Schröder). This chronic vaginitis leads to loss of tonicity of the mucous membrane, and favours its prolapse.

The emphysematous vaginitis of lying-in women is also confined to the production of a discharge. Sometimes innocent vegetations or papillomata are seen on the walls of the vagina, which have been irritated by the prolonged contact of a mucopurulent secretion; they are very common in gonorrhœal vaginitis, but are also seen in the non-specific vaginitis of pregnant women.

The expulsion of shreds of mucous membrane after astringent injections or simply under the influence of very acute inflammation has been called "exfoliative vaginitis"; it is only a somewhat rare epiphenomenon, which must not be confounded with expulsion of an intra-uterine membrane in membranous

* Säger. On gonorrhœa in the female. French trans. by Labusquière (*Ann. de Gyn.*, Feb., 1890, vol. 33, p. 129).

dysmenorrhœa; the microscope will show here large cells of pavement epithelium.

Diagnosis.—The real difficulty in diagnosis consists in determining the nature, specific or otherwise, of the vaginitis. The absence of the gonococcus from the vagina does not constitute a sufficient element of information, for it may be wanting from being destroyed, or it may be unfindable in old gonorrhœa, as I have said above; the presence of urethritis is, on the contrary, a proof of the gonorrhœal nature of the disease. It is therefore in the urethra that the characteristic micro-organisms must be sought for. The progress of the disease and the antecedents of the patient will also yield valuable information. If we can also confront the woman with the presumed author of contamination, which is fairly often possible in practice, the existence of gonorrhœa, even though very old and very likely to be passed over, in the man will be demonstrative. Blennorrhagic ophthalmia in one or several children will be equally valuable. The existence in the female patient of vegetations—in the absence of pregnancy—is strong presumptive evidence; co-existent inflammation of Bartholin's glands is an almost infallible sign of gonorrhœal infection.

In young girls care must be taken, particularly in a medico-legal examination, not to come too rapidly to a conclusion that the discharge is of an infective origin; it is well known that vulvitis, kept up by lack of cleanliness, may by its extension lead to vaginitis, particularly in strumous children; here also the co-existence of urethritis is of the greatest importance. Vaginitis of pregnant women must always be borne in mind, to avoid similar mistakes; it must not be forgotten that this variety also may lead to the formation of vegetations.

The inflammatory secretion must not be confounded with the foetid discharge of cancer, or with that which follows on abortion with retention of the membranes.

Prognosis.—Gonorrhœal vaginitis is a serious affection, on account of its extension to the cervix uteri, and thence sometimes to the uterus and the tubes.* It is besides very resistant to treatment, and old inflammation which seems to have died out is often seen to light up afresh under the influence of some

* Fournier. Art. Blennorrhagie, in Dict. of Med. and Chir., Paris, 1866, vol. 5, p. 129.

occasional cause, such as excessive coitus, chills during menstruation, extreme fatigue, or the puerperal state. In this course there is something which recalls the course of old gleet in the male. Gonorrhœa in the female is an incomparably more serious affection than in the male; this is easily understood by comparing the prognosis of cervical metritis with that of a chronic gleet which has limited itself to the cul-de-sac of the bulbous portion of the urethra, or again the prognosis of tubo-ovaritis, which so often is suppurative, with that of epididymo-orchitis, which is so rarely a serious affection. In women again the ascending lesions of gonorrhœa are more frequently bilateral and the cause of sterility than in men; obliteration of both tubes from chronic salpingitis is the rule in prostitutes.

The serious point about gonorrhœa in the female is that an apparently insignificant trace of infection in the cervix may, under the influence of the puerperal state, resume all its primary virulence, combine with septic infection (mixed infection, "puerpero-gonorrhœal"), and lead to the most dangerous results. We see therefore the extreme importance of rapid and energetic treatment which will free the woman from all traces which may remain a perpetual source of danger for her. Nöggerath's opinion* on the incurability of the disease is only too absolute if the patient be energetically and early put under treatment.

The seriousness of gonorrhœa in young girls arises from the fact that, as in the case of adults, it may extend to the uterus, the tubes, and the peritoneum. Säxinger has seen cases of pyo-salpingitis in virgins which could only be explained by a gonorrhœal infection without coitus, by contact. I have myself operated upon a case of this kind. A case of general peritonitis reported by Welanders was in a young girl of five years. I also saw a case at my hospital in a young girl. These cases are extremely rare, but death from suppurative pelvi-peritonitis, in consequence of pyo-salpinx, may very often result from gonorrhœal infection.

The prognosis of the other varieties of vaginitis is much less serious, and they yield far more easily to treatment.

* Nöggerath. Ueber latente u. chronische Gonorrhoe beim weibl. Geschlecht (Deut. med. Woch., 1887, No. 49, p. 1059).—Schwarz. Die gonorrhoeische Infection beim Weibe (Samml. klin. Vorträge, 1886, No. 279).

Treatment.—First of all, causes must be sought for which may provoke or keep up the chronic inflammation, such as pessaries, thread-worms, or cervical catarrh. A very large number of cases of vaginitis yield to the treatment of the vaginitis which keeps them up. It is thus that Schröder's operation (excision of the cervical mucous membrane) is the best method of cure for certain cases of chronic vaginitis kept up by cervical infection of gonorrhœal origin. For chronic granular vaginitis and senile vaginitis good will be derived from the application of long tampons of absorbent cotton-wool, impregnated with glycerine of borax or of tannic acid, every other day, and washing with a 5 per cent. solution of nitrate of silver.

In the acute stage of gonorrhœal vaginitis, emollients have been recommended. It is certain that prolonged baths and demulcent drinks greatly relieve the urethritis that accompanies the vaginal inflammation. But, on the other hand, injections of marsh-mallow, linseed, &c., are of very doubtful utility, and may even be hurtful, for they are sometimes very far from being aseptic. Much better is copious irrigation with 4 to 6 litres of boiled water, with the addition of a small quantity of sublimate (1 to 10,000). A small glass canula should be used, and introduced with the utmost gentleness, on account of the extreme tenderness of the vagina. As soon as it can be borne the speculum shown in fig. 4 should be adapted to the canula, and will be of the greatest advantage. It is very important to place the canula after each irrigation into a solution of carbolic acid (1 in 20), where it must be left for some time. In this way we shall avoid the fresh inoculations to which the patient would be exposed if this precaution were not taken. The patient must be confined to bed.

As soon as the acute period has passed, energetic antiseptic treatment should be commenced; injections should be given twice daily with 1 in 2,000 sublimate, care being taken to draw out the folds in the vagina, and to rinse out the culs-de-sac with the finger deeply inserted into them for the purpose; after each injection a plug of iodoform gauze, moderately packed, and the size of a pigeon's egg, should be introduced up to the cervix uteri; this tampon takes up the secretion, and thus acts at one and the same time as an antiseptic and as a means of drainage. If necessary, the sublimate injections may be replaced by

injections of creoline, potassium permanganate, carbolic acid, boracic acid, alum, tannin, saponified coal-tar, resorcin, or chloral. But sublimate is incomparably more efficacious, and in these cases I have seen no ill-effects from its use. Fritsch * greatly recommends chloride of zinc, 10 grammes to the litre (1 per cent. solution). In pregnant women sublimate must only be injected with the greatest care, and with the certainty of issue of the fluid by the introduction of a speculum, on account of the ease with which mercurials are absorbed.

The so-called balsamic treatment is for the accompanying urethritis; but copaiba and cubebs are not well borne by women, and moreover the urethritis is incomparably less obstinate in them than what it is in men, on account of the straightness, the shortness, and the capacity of the canal. Iodoform pencils (cocoa-butter and iodoform) introduced into the canal and gently crushed by pressure in the vagina are very useful in the chronic stage.

When the treatment of the vaginitis is sufficiently advanced, it is best to attack without delay any metritis which may have originated therefrom, and which itself keeps up the last traces of vaginal inflammation.

General treatment must not be neglected; iron and tonics should be administered to anæmic patients. Scrofulous children should be put under a suitable treatment.

Foreign writers describe under the name of "croupous" or "diphtheritic" vaginitis the formation of false membranes, due to the superficial necrosis of the mucous membrane, which have nothing in common with the signification given in France to the word "diphtheria." It is only a gangrene of the vagina, a more exact definition than that of "gangrenous vaginitis," which is met with in cases of intense septic infection of the vagina, or in certain cases of cancer of the uterus, of sloughing fibroids, or of pessaries that have been left indefinitely in a vagina, devoid of all cares of cleanliness. It has also been seen in intense gonorrhœa in the puerperal state, in the course of acute infectious diseases (scarlatina, variola, typhus). It is in no ways a distinct morbid variety, but a septic accident engrafted upon inflammatory vaginal lesions. It offers no fresh indication for treatment, except the necessity of watching

* Fritsch, *Centr. f. Gyn.*, 1887, No. 30, p. 477.

for the adhesions and contractions which may follow upon exfoliation of portions of the necrosed mucous membrane; for this purpose, frequently renewed antiseptic tampons should be kept in the vagina to separate the surfaces.

Dissecting phlegmonous peri-vaginitis,* or suppurative inflammation of the cellular tissue situated around the vagina, is only a special and very rare localisation of pelvic suppuration. It has been observed in the later stages of serious fevers. The treatment consists in giving exit to the pus as soon as it is recognised.

* G. Marconnet. *Virchow's Arch.*, 1865, vol. 34, p. 226.—Minkiewitsch. *Ibid.*, 1867, vol. 41, p. 437.—Bizzozero. *Gaz. delle Clin.*, Turin, 1875.—Tschernitschew. *Cent. f. Gyn.*, 1881, p. 114.

CHAPTER II.

CYSTS.—FIBROIDS AND POLYPI.—PRIMARY CANCER.

CYSTS.

Cysts. Definition. Cysts properly so-called and cystic pachyvaginitis. Pathological anatomy. Pathogenesis. *Ætiology.* Pathological anatomy. Symptoms. Diagnosis. Treatment.—Fibroids and polypi. Pathological anatomy. *Ætiology.* Symptoms and diagnosis. Treatment.—Primary cancer. Pathological anatomy. *Ætiology.* Course and symptoms. Diagnosis. Treatment.

Definition.—Under the same name and in the same chapter have often been described two affections which are nevertheless widely different: (1) a chronic, stationary lesion, interesting from an anatomical point of view, of no surgical importance, characterised by small lacunæ, the size of which does not generally exceed that of a millet or hemp-seed, present in great numbers and disseminated over the whole extent of the vagina; (2) a lesion which occasions serious disorders and which calls for active interference, represented by cysts with very definite walls, few in number, varying in size from that of a Spanish nut to that of an egg or more, and which has a tendency to increase in volume unless the surgeon interfere.

These two affections, essentially distinct by their pathological anatomy, their course, symptoms, and therapeutic indications, have been artificially brought into close contact. In reality, the first is only a variety of chronic vaginitis, a “cystic colpohyperplasia,” according to the name which has been given it by Winkel.* I have already briefly described it when speaking of the vaginitis of pregnancy. The contents of these lacunæ are sometimes liquid, sometimes gaseous (containing trimethyl-

* F. Winkel. Ueber die Cysten der Scheide insbesondere eine bei Schwangeren vorkommende Colpohyperplasia cystica (Arch. f. Gyn., 1871, vol. 2, p. 838)

amine), from which they have also been described under the name of "emphysematous vaginitis."*

I shall exclude from the consideration of cysts of the vagina properly so-called this "cystic pachyvaginitis," the pathogenesis of which is still very obscure, the symptomatology almost wanting, and the therapeutics of which are mixed up with those of chronic vaginitis.

Pathogenesis.—The most varied theories have been put forward in explanation of the origin of vaginal cysts.

Huguier, † in a paper that long remained classical, assigned to them a glandular origin, and divided them into superficial and deep, according to the seat of the two kinds of glands that he described in the vaginal walls. Now these glands have no existence, but they may be simulated anatomically by crypts or lacunæ, which, from obliteration of their narrow orifice, play the same pathological part. Virchow, ‡ A. Guérin, § and Preuschen || hold this theory of glandular or pseudo-glandular cysts; Poupinel ¶ holds it for a certain number of cases. Other writers, amongst whom must be mentioned Eustache, ** Tillaux †† and his pupil Thalinger, ‡‡ are disposed to see in them hygromata or accidental serous bursæ (the result of a trade according to Courty, who believes that he has found them very frequently in prostitutes). W. Thorn §§ holds a similar opinion; with regard to cysts observed in women who have borne children, he believes that there has been a traumatic effusion of serum, similar to that which Morel-Lavallié has described in other regions.

A theory which rests upon very probable facts has been put

* Zweifel. Vaginitis emphysematosa (Arch. f. Gyn., 1877, vol. 12, p. 39).—Ueber Vag. emphy. u. den Nachweis des Trimethylamin in der Vagina (ibid., 1881, vol. 18, p. 359).—Lebedeff. Ueber die Gascysten der Scheide (ibid., 1881, vol. 18, p. 132). The latter has seen them in the absence of pregnancy.—Cf. on the history and pathological anatomy of this affection, Jacobs (of Brussels), On vascular cysts of the vagina (Arch. de physiol. norm. et path., 1888, vol. 2, p. 261).

† Huguier. Mém. Soc. de Chir., 1847, vol. 1, p. 241.

‡ Virchow. Die krankhaften Geschwülste, 1863, vol. 1, p. 247.

§ A. Guérin. Diseases of the female external generative organs, 1864, p. 429.

|| Preuschen. Centr. f. Med., 1871, p. 773.

¶ Poupinel. Bull. de la Soc. anat., 1888, p. 224.

** Eustache. Arch. de Tocol., 1878, vol. 5, p. 191.

†† Tillaux. Gaz. des Hôp., 1885, p. 505.

‡‡ Thalinger. On vaginal cysts, particularly cysts on the anterior wall. Thesis, Paris, 1885.

§§ W. Thorn. Zur Aetiologie der Vaginalcysten (Centr. f. Gyn., 1889, No. 33, p. 657).

forward by Veit,* and explains the origin of cysts of the vagina as arising from traces of the Wolffian ducts, which in certain animals in which they are very apparent bear the name of Gärtner's canal.

The formation of some cysts of the vagina has been attributed to the independence of the Müllerian ducts, and to the existence of a lateral vaginal cavity ending in a blind extremity below and the result of an abortive attempt at a bifid condition. These cavities ought to be approximated to hæmato-colpos and pyo-colpos, and have been, I think, wrongly approximated to cysts. I shall return to this point when considering the diagnosis.

Are some large cysts the result of lymphangiectasis, such as are perhaps the gas-containing lacunæ of cystic pachyvaginitis? This theory, which was first sustained by Klebs, has been accepted in explanation of a certain number of cases by other authorities.†

To sum up, if a general glance be given to the theories that have been put forward, and are still supported upon the pathogenesis of the somewhat complex clinical group which constitutes cysts of the vagina, we see that writers refer them to diverse origins, without, however, any single one of them corresponding to a definite anatomical type. One mode of pathogenesis only seems to be beyond doubt in a certain number of cases; it is that which refers them to the Wolffian ducts, and is characterised in the most definite cases by the presence of several cysts with moniliform arrangement, or by an upper prolongation towards the broad ligament. All the other modes of origin are hypothetical and especially are based upon far-fetched analogies. I believe that all large cysts of greater size than a Spanish nut should be referred to this embryonic origin. It will be remarked that they are often single or very few in number, and that they are

* J. Veit. Krankh. der weibl. Geschlechtsorgane in Virchow's Handb. der spec. Path. u. Ther., 1887, vol. 6, p. 544;—Ueber einen Fall von der grossen Scheidencyste (Zeitschr. f. Geb. u. Gyn., 1882, vol. 8, p. 471).—C. Rieder. Ueber die Gärtner'schen Kanäle beim menschlichen Weibe (Virchow's Arch., 1884, vol. 96, part 1, p. 100).—W. Fischel. Ueber das Vorkommen von Resten des Wolff'schen Ganges in der vaginalportion (Arch. f. Gyn., 1884, vol. 24, p. 119).

† Klebs. Cystenbildung, in Handb. der path. Anat., 1876, vol. 1, p. 964.—Fischel. Kasuistischer Beitrag zur Lehre von den Scheidencysten (Arch. f. Gyn., 1888, vol. 33, p. 219).—W. Kümmel. Ueber cystische Bildungen in der Vagina und im Vestibulum Vaginae (Virchow's Arch., 1888, vol. 114, p. 407).

arranged in a vertical series, as if they originated from moniliform expansion of a straight cord. With regard to the small cysts which are found scattered in large numbers over the whole surface, or over a limited portion of the vagina in groups and in no definite order, I am quite ready to allow their *pseudo-glandular formation* by obliteration of crypts or of lacunæ at the bottom of which epithelium first of all accumulated, but afterwards was replaced by the exudation of liquid. It is easy to recognise the reality of these two clinical and anatomical varieties in reading the published cases.

Without going so far as to absolutely deny the possibility of the other modes of origin, I think they are excessively rare; in this connection must be mentioned the unique case of a hydatid cyst of the vaginal wall observed by Porak.*

Ætiology.—Cysts of the vagina are seen at all ages, in virgins as well as in multiparæ. Has excessive coitus any real influence, as Courty holds? It is very doubtful. On the other hand, parturition might have some influence, not in consequence of any traumatic injury of the vagina, but by the nutritive hyperactivity that pregnancy impresses upon the whole generative apparatus, and which might have an echo in abnormally persistent foetal remains, or upon the epithelium which lines the folds and crypts of the mucous membrane.

Pathological anatomy.—Cysts of the vagina are most generally solitary. Out of 128 cases collected by Poupinel,† only in 28 (or about 22 per cent. of cases) were several found. Rarely are there more than 3 or 4. Poupinel has seen a case in which there were 15 collected at one spot and forming a single tumour; very probably they were pseudo-glandular cysts. The cysts which seem to originate from the Wolffian body are generally single, or more rarely multiple, and arranged in a chain one below another (Johnston).‡ They vary in size from that of a pea to that of a turkey's egg. Veit has seen one the size of a foetal head.§ Their seat of predilection is in the upper third of the anterior or posterior wall. In one case, that of Bastel-

* Porak. Arch. de tocol., 1884, p. 163.

† Poupinel. On Cysts of the vagina (Rev. de chir., July, Aug., 1889, pp. 558 and 657).

‡ Johnston. A contribution to the study of cysts of the vagina (Amer. Journ. of Obstet., 1887, vol. 20, p. 1144).

§ J. Veit. Zeitschr. f. Geb. u. Gyn., 1882, vol. 8, p. 471.

berger,* the hymen was included in the cyst wall. Sometimes the sac has presented a prolongation upwards. In Watts'† often cited case, the sound introduced through an incision into the cyst passed upwards in the direction of the broad ligament. Boursier‡ has seen a solid pedicle passing upwards and deeply. Reboul§ has also seen a case of the same kind, but the pedicle was partly hollow. These cases, evidently, are referable to cysts of a Wolffian origin.

The wall is formed of finely fibrillar connective tissue; it sometimes contains a few muscular fibres, which, however, do not appear to have the pathognomonic significance which Poupinel attributes to them in the question of cysts arising from



Fig. 388.—Section of the wall of a vaginal cyst (Schröder).

Above, vaginal squamous epithelium; below, cylindrical epithelium of the cyst.

Gärtner's canal. As a rule the vaginal mucous membrane covers the cyst; but it may happen that its development has so worn away and thinned the mucous membrane that it becomes fused in front with the cyst-wall, which henceforth is transparent. On the other hand, such wearing away has occurred behind and led to perforation into the bladder, as in a unique case reported by Veit.|| In the majority of cases, the internal surface of the cyst

* Bastelberger. *Arch. f. Gyn.*, 1884, vol. 23, p. 427.

† Watts. Case of anterior vaginal wall developed from Gärtner's canal (*Amer. Journ. of Obstet.*, 1881, vol. 14, p. 848).

‡ Boursier (of Bordeaux). *Lectures on clin. surg.*, p. 237.

§ Reboul. *Ann. de Gyn.*, 1889, vol. 32, p. 126.

|| Veit. *Loc. cit.*—The orifice of communication admitted the little finger; the cyst had dermoid contents without hairs or teeth, and a wall lined by pavement epithelium.

is lined by cylindrical epithelium (Ruge), although in the same cavity, or in others, pavement epithelium has also been seen (Meyer, Lebedeff, Ruge, Baumgarten, &c.).* Excentric compression of the epithelium due to distension of the sac has in certain cases given to the cylindrical epithelium a flattened and quasi-pavement appearance (Max Graefe).†

Vibratile epithelium has rarely been observed (6 times out of 52 cases, according to Poupinel). The internal wall and the epithelial covering have seemed to be completely wanting in 4 published cases (Verneuil, Ladreit de la Charrière,‡ Lebedeff). These are the cases which have lent some support to the hygroma-theory. But even supposing the examination to have been made under perfect conditions, destruction of the internal lining may be attributed to a variety of different causes.

On the internal surface papillary projections have sometimes been seen (Kaltenbach, § M. Graefe). Kleinwächter|| has met with adenoid degeneration of the cyst wall. The contents of the cysts vary in their consistence and colour. Generally they are viscid and transparent, or of the colour of barley-sugar; they may contain pus or modified blood. Chéron¶ has described a vaginal cyst opening into the urethra and enclosing a calculus, but probably the case was one of an unrecognised urethrocele. Breisky, however, does not consider it impossible for the sac of a urethrocele to become isolated by obliteration of its orifice, and to thus form a pseudo-cyst.

Symptoms.—At first the cyst is unrecognised. Usually the first symptom which indicates its presence is the vaginal prolapse to which the increasing projection of the tumour leads, and which the patient imagines is a “falling of the womb.” Sometimes it is a chance medical examination necessitated by pregnancy, or gonorrhœa, which leads to the discovery of the lesion. The tumour is rounded, smooth, sessile, or tends to

* P. Baumgarten. Ueber Vaginalcysten (Virchow's Arch., 1887, vol. 108, p. 528).

† M. Graefe. Zehn Fälle von Vaginalcysten (Zeitschr. f. Geb. u. Gyn., 1882, vol. 8, p. 460).

‡ Ladreit de la Charrière. Arch. gén. de méd., 1858, vol. 1, p. 528.

§ Kaltenbach. Zusammengesetzte Cyste der Scheide (Arch. f. Gyn., 1873, vol. 5, p. 188).

|| Kleinwächter. Ein Beitrag zu den Vaginalcysten (Zeitschr. f. Geb. u. Gyn., 1889, vol. 15, part 1, p. 86). Work based upon 9 unpublished cases.

¶ Chéron. Large calculus developing in a cyst of the vagina which opened into the urethra, in a woman aged 67 (Gaz. des Hôp., April 80, 1887, p. 429).

become pediculate; the mucous membrane which covers it preserves its normal colour; it is rarely thinned and transparent. Fluctuation is often difficult to perceive when the cyst is small and tense; it may sometimes be elicited by seizing the tumour between two fingers, and by the combination of rectal and vaginal examination. When the woman is told to "bear down" the tumour is seen to present at the vulva, and to pass outside it like a cystocele if it be situated at the lower portion of the vagina.

When the cyst has reached a certain size there is present a sensation of weight, and some difficulty in walking. Leucorrhœa may be induced from irritation of the mucous membrane, which is exposed to the air when the tumour prolapses.

In a case that came under my notice a large solitary cyst coincided with a vertical partition of the vagina, a fact which seemed to bear witness to its embryonic origin.

The cysts are rarely of sufficient size to prove any definite obstacle to the excretion of the urine or to parturition. It, however, would be possible for parturition to lead to their rupture, which would soon be followed by a recurrence.*

Diagnosis.—I have already spoken of the distinction between a cyst of the vagina and cystic pachyvaginitis, characterised by the presence of numerous and very small cavities hollowed out in the substance or on the surface of the thickened mucous membrane. This affection is especially met with in pregnancy (though not exclusively so), and the small cavities contain gas, which sometimes escapes with a report when they are pricked.

Large cysts of the vagina, in the immense majority of cases, form a single tumour which projects from the anterior or posterior vaginal wall, after the manner of a cystocele, a urethrocele, or a rectocele, when it is situated in the inferior third of the canal. Mistake will be avoided by combining catheterisation or rectal examination with the vaginal examination.

Strictly speaking, with vaginal cysts might be confounded certain peri-urethral cysts of the vestibule, originating in the crypts which surround the meatus uriniarius. They rarely

* Spontaneous rupture of a cyst has been known during pregnancy. Magnin. Cyst of the vagina; spontaneous rupture in the seventh month of pregnancy; uninterrupted recovery (*Journ. de méd. et de chir. prat.*, 1883, p. 184).

exceed the size of a lentil, but Preuschen has seen one which was the size of a small nut. It is not impossible that these cysts also arise from Gärtner's canal* at its terminal extremity. Skene† thinks they are derived from two particular peri-urethral glands of which he has given a description, but the existence of which is more than doubtful.

Cysts in the upper third of the vagina may at first be only differentiated with difficulty from small tumours situated in Douglas' pouch, *e.g.*, cystic or non-cystic prolapsed ovaries, inflamed tubes, foci of peri-salpingitis.

A careful examination, under chloroform if necessary, will remove all doubt.

With cysts of the vagina have sometimes been confused certain collections of fluid that are essentially distinct, and formed in an accessory vaginal canal resulting from a bifid condition of the part from incomplete fusion of the Müllerian ducts. When this bifid condition, as is usually the case, continues right down to the vulva, there are two vaginæ, one of which is, as a rule, more or less atrophied; but in those exceptional cases in which the second vagina terminates below in a cul-de-sac, instead of being open, it forms a closed cavity, which opens above the second infra-vaginal cervix resulting from the simultaneous bifid condition of the uterus. This condition may remain latent until puberty. The sac, which becomes filled with menstrual blood, then gives rise to a lateral hæmato-colpos, or, if the cavity suppurate, to a lateral pyo-colpos. As the bifid nature of the cervix is still masked, one does not suspect quite at first the particular nature of the collection in the vagina, which may be taken for a cyst until it has been opened, and the second cervix has been discovered at the upper end. I have seen a case of this kind in which the pseudo-cystic sac had suppurated and given rise to a fistula.‡

* J. Kocks. Ueber die Gärtner'schen Gänge beim Weibe (*Arch. f. Gyn.*, 1882, vol. 20, p. 487).—Kleinwächter. Ein Beitrag zur Anat. und Path. des Vestibulum Vaginæ (*Prag. med. Woch.*, 1883, No. 9).—This opinion has been opposed by Dohrn. *Arch. f. Gyn.*, 1883, vol. 21, p. 328.—Cf. the summary of these discussions in Winckel, *Lehrb. der Frauenkr.*, 2nd ed., 1890, p. 147.

† Skene. The anatomy and pathology of two important glands of the female urethra (*Amer. Journ. of Obstet.*, 1880, vol. 13, p. 265).

‡ This inflammation, moreover, did not come from the retention of menses, which did not seem to be produced by the atrophied portion of the uterus—viz., that corresponding to the small vagina terminating in a cul-de-sac. The suppuration

Hydatid cysts * of the true pelvis have been known to project into the vagina, either in the vesico-vaginal partition or in the recto-vaginal partition, and have simulated cysts properly so-called.

Treatment.—The different operations which have been recommended for other sub-mucous cysts, for example ranula, may be applied here. Puncture and incision alone are absolutely insufficient. Puncture followed by the injection of caustic fluids runs the risk of producing an excessive inflammation, which may extend to the bladder or the peritoneum; there may in point of fact be present quite unexpected connections or prolongations of the cystic cavity. The surgeon will rather have to decide between complete and partial extirpation. The first procedure will be preferable if the tumour be easily accessible, as when it is situated close to the vulva. Nevertheless the dissection is then very difficult on account of the adhesion of the urethra and the bladder on the deep surface and in the neighbourhood. It even becomes almost impossible if the cyst have ruptured during the operation. To obviate these disadvantages, in one case I resorted to a plan which I described some years ago to facilitate the dissection of certain cystic sacs.† After having emptied the tumour, I filled it with spermaceti, which I solidified by the application of ice, and in this way I easily succeeded in dissecting out the tumour. The wound is to be immediately united by an uninterrupted catgut suture commencing in the deeper parts.

Partial extirpation will be preferable for cysts situated in the upper third of the vagina towards its posterior wall; the tumour should be seized with tenaculum forceps, and with a cut of the scissors a segment of the sac with the mucous membrane which covers it should be removed. Schröder recommends immediate suture of the cut surface of the vaginal mucous membrane to that of the sac, so as to keep the orifice widely open. This precaution seems to me to be unnecessary; it will be sufficient

originated from a gonorrhoea affecting the principal vagina, propagated, no doubt, to the second accessory vagina through the medium of the cervix uteri, where the partition must have been incomplete.

* Schatz. Beiträge mecklemb. Aerzte zur Lehre von der Echinococcenkrankheit, Stuttgart, 1885.

† S. Pozzi. A method for facilitating the dissection and removal of certain cysts with liquid or semi-liquid contents. (Bull. et Mém. de la Soc. de chir., 1878, p. 715.)

to plug the fundus of the sac with iodoform gauze; the deep part which has not been removed will exfoliate spontaneously.

FIBROIDS AND POLYPI.

Pathological anatomy.—Fibroids of the vagina may originate in the uterus and descend by degrees, at the same time making their way between the layers of the recto-vaginal septum, but there also exist tumours which have originated *in situ*.

Their structure* is similar to that of uterine fibroids; they are composed of a mixture of connective tissue and smooth muscular fibres. Paget† has described the only known case of a tumour exclusively composed of fibrous tissue.

The seat of predilection of the tumour is the upper part of the anterior vaginal wall. They may be very adherent to the urethra‡ and encroach upon the vulva.§ Their volume is generally small; but cases have been reported in which they have weighed more than 2 pounds.¶ They may become pediculated and take on a polypoid shape; softening and œdema, as in the case of uterine fibroids, has been noticed; they may also necrose superficially and ulcerate.

* Mucous polypi have been described (Beigel, Klob) resulting from partial hyperplasia of the vaginal mucous membrane (Breisky, *Die Krankh. der Vagina*, 1886, p. 162). Some of these formations, which are very rare, seem to enclose considerable lymphatic dilatations, which would justify a comparison between them and "molluscum pendulosum vulvæ," and the name of "elephantiasis mollis," under which Meinert described a specimen that he showed at the Gynæcological Soc. of Dresden (April 12, 1888).

† Paget. *Lectures on surgical pathology*, vol. 2, p. 115.

‡ Tillaux. Fibro-myoma of the urethra (*Ann. de gyn.*, Sept., 1889, vol. 82, p. 161). This case is manifestly a vaginal fibroid adherent to the urethra. Griffith (*Obst. Soc., Lond.*, July 6, 1889, in *Centr. f. Gyn.*, 1889, No. 50, p. 877) has seen an exactly similar case of a fibroid adherent to the urethra.

§ E. Fränkel. Orangengroßes breitbasiges Fibromyom der Vagina und Vulva. Enucleation. Heilung (*Bresl. ärztl. Zeitschr.*, 1887, vol. 9, p. 59).

¶ R. Hastenpflug (*Ueber vaginale Myome*, Inaug. Dissert., Jena, 1888) has reported a case occurring in Schultze's wards in which the vaginal fibroid reached an extraordinary size. Originating from the anterior vaginal wall on the left of the cervix, it filled the whole canal, and reached below to the vagina and above to a hand's-breadth from the umbilicus, at the same time raising the uterus; it had become gangrenous in part.

Other examples of large fibromata will be found in the following works: A. Lewers. Fibroid tumour of the vagina (*Trans. Obst. Soc., Lond.*, 1887, vol. 29, p. 299).—Tolunichin. Russian Journ. of Obst. and Gyn., vol. 1, Nos. 7 and 8 (anal. in *Centr. f. Gyn.*, 1888, No. 7, p. 111).—P. Strassmann. Zur Kenntniss der Neubildungen der Scheide (*ibid.*, 1891, p. 825).

Ætiology.—They are generally met with in middle life; but some cases have been known in very young children (Trätzl, Wilson, A. Martin).*

Symptoms.—These depend principally on the size of the tumours; if very small, they are unrecognised, or at most occasion slight leucorrhœa; if larger, they lead to hæmorrhage† and compression-phenomena especially affecting the bladder; a few cases have been known in which a fibroid of the vagina had been a cause of dystocia.

Diagnosis can only be rendered uncertain if changes have been produced in the tumour by œdema or ulceration. It might then be thought to be a cancer. Careful consideration of the connections will suffice for the distinction between a polypus of the vagina and a uterine polypus, a prolapsed or an inverted uterus.

Treatment.—This will consist in enucleation of sessile tumours and in dividing the pedicle of polypi. The procedures will be similar to those indicated in the chapter on the treatment of uterine fibroids of vaginal evolution.

PRIMARY CANCER OF THE VAGINA.

Pathological anatomy.—Generally cancer of the vagina results from extension of disease affecting the cervix. It may also result from extension from the vulva. Primary cancer is very rare: A. Martin only found it once in 5,000 women. It presents itself in three distinct forms: 1. The vegetating or papillary variety. 2. The infiltrated or nodular variety; both of these histologically are epitheliomata. 3. Sarcoma, either diffuse of the whole mucous membrane, or circumscribed and coming from the degeneration of a fibroid.

Ætiology.—Cancer of the vagina may be met with in early life, but it is most commonly seen in middle life. Out of 24 cases collected by Küstner,‡ the majority concerned women of

* Trätzl. *Monatschr. f. Geb.*, 1868, vol. 22, p. 227.—Wilson. *Med. Times and Gaz.*, April, 1876, p. 360.—A. Martin. *Zeitschr. f. Geb. u. Gyn.*, 1878, vol. 3, p. 406.

† A. Donald. Fibroid tumour of the vagina associated with uterine hæmorrhage (*Med. Chronicle, Manchester*, 1888, p. 808).

‡ Küstner. *Arch. f. Gyn.*, 1876, vol. 9, p. 279.

from 30 to 40 years of age, two occurred in women from 15 to 20 years, and two between 20 and 30 years. Guersant has reported the case of cancer of the commencement of the vagina in a child aged $3\frac{1}{2}$ years, and Johannowsky in a child aged 9 years.* Küstner only found an hereditary tendency in a single case. Hegar has seen cancer occur in an ulceration produced by a pessary. It is nevertheless remarkable that cancer has never been seen in a prolapsed uterus, which is exposed to all the causes of external irritation.

Epithelioma of the papillary variety usually commences on the posterior vaginal wall as an excrescence, with a large base that first of all invades the cul-de-sac, and afterwards extends from above downwards towards the vulva, and from below upwards towards the cervix. It sometimes starts in plaques of chronic vaginitis, which have been compared, somewhat theoretically, to buccal leucoplasia, the starting-point of cancer of the tongue.†

Epithelioma of the nodular or infiltrating variety commences over a large area by islands, which rapidly become confluent, and which sometimes seem to be specially localised around the urethral canal, giving rise to a fairly definite clinical variety, "peri-urethral cancer." Ulceration proceeds rapidly.

Sarcoma is of two kinds: 1. Diffuse sarcoma of the mucous membrane, which presents the curious feature of sometimes attacking quite small children.‡ 2. Fibro-sarcomata, or rather sarcomatous fibroids, a slow degeneration often only revealed by the recurrence of a fibroid or a polypus after removal. In one case striated muscular fibres were found.§ Melanotic sarcoma|| has also been met with.

* Cases cited by Winckel, *loc. cit.*, p. 161.

† Reclus. Cancer and leucoplasia of the buccal and vaginal mucous membranes (*Gaz. hebdomadaire de médecine*, 1887, p. 420).—Perrin. *Congr. Assoc. franç. pour l'avanc. des sciences*, Marseilles, 1891.

‡ A large number of cases is now known of primary sarcoma of the vagina in children of from 2 to 5 years of age, reported by Sänger, Ahlfeld, Soltmann, Hauser, Babès, Grünischer, Schuchardt, Steinthal.—Cf. on this subject: Grünischer. *Inaug. Dissert.*, Munich, 1880.—Schuchardt. *Gyn. Congr. at Halle (Centr. f. Gyn.*, 1888, p. 432).—Steinthal. *Ueber die primäre Scheidensarcome* (*Virchow's Arch.*, 1888, vol. 111, p. 449).—Schuchardt. *Ueber die papillären Scheidencarcinom kleiner Kinder* (*Verhandl. der deutsch. Gesell. f. Gyn.*, Leipzig, 1888, p. 237).

§ Kaschewarowa-Rudnewa. *Virchow's Arch.*, 1872, vol. 54, p. 65 (Case from Seyfert's wards at Prague in 1869, of a young girl aged 15 years; recurrent fibroid of the anterior wall; rapid death from cachexia and tuberculosis; the tumour was a "myxomatous rhabdomyoma").

|| Parona. *Ann. univ. di med. et chir.*, Milan, 1887, p. 241. The case was one of a

The course of cancer of the vagina is usually a rapid one, except in the fibro-sarcomatous variety, which may be extremely slow. Extension takes place very rapidly to the neighbouring parts and the lymphatics.

The rational symptoms are the same as those of cancer of the cervix: fetid discharge, hæmorrhage, pain, compression of bladder and of rectum. Neither syphilitic ulceration, which is quite exceptional,* nor simple round ulcer,† which is a rare and ill-defined lesion, need be taken into account.

Treatment has very little chance of leading to a permanent recovery,‡ but an attempt must be made to retard the progress of the disease. Extirpation should only be attempted if it be possible to remove the whole of the new growth;§ the great laxity of the vaginal walls then allows of the bringing together of the edges of even extensive wounds. Hegar and Kaltenbach recommend interference even when it is necessary to cut into the bladder and rectum. Mundé|| in one case opened up Douglas' pouch, immediately stitched up the wound with catgut, and his patient recovered, in spite of a slight attack of consecutive pelvic peritonitis. In a case of cancer of the posterior wall, Rüter¶ stitched up the bleeding surface left by extirpation to the cervix uteri, which he had previously freshened. This kind of restoration by an autoplasmic operation

melanotic sarcoma of the vesico-vaginal septum, removed with a portion of the bladder. Temporary recovery.

* Prieur. On secondary vaginal syphilis. Thesis, Paris, 1881.

† W. Zahn (Virchow's Archiv, 1884, vol. 95, p. 388) has described under this name an ulcer with precipitous edges and reddened base that he found in the posterior vaginal cul-de-sac of a woman aged 66. There was no induration. The connective tissue was infiltrated by small cells, and there was fatty degeneration of the muscular fibres; many micrococci were present. There was atheromatous narrowing of the vaginal arteries, and obliteration of a branch that supplied the region occupied by the ulcer. Zahn compares this ulcer from ischæmia to certain gastric ulcers. A similar case has been published by Browicz (Centr. f. Gyn., 1887, p. 414), under the name of "rodent ulcer of Clark." This also occurred in an old woman (æt. 59) who had arterial sclerosis. In a word, these ulcers appear to be the result of true infarcts, and have only been seen under those conditions in which thrombosis can occur. This consideration would aid in the formation of a diagnosis.

‡ Herzfeld (Allg. Wien. med. Zeit., 1889, No. 48) operated for a primary sarcoma of the vagina which recurred after five months.

§ Brückner. Die primäre Scheidenkrebs und seine Behandlung (Zeit. f. Geb. u. Gyn., 1881, vol. 6, p. 110).

|| Mundé. Two cases of primary epithelioma of the vulva and vagina (Amer. Journ. of Obstet., 1889, vol. 23, p. 476).

¶ Rüter (of Hamburg). Centr. f. Gyn., 1887, No. 38, p. 606.

seems to have prevented recurrence, and three years later the patient became pregnant.

In a woman in whom the cancer occupied the whole recto-vaginal septum, which was partly destroyed, and gave rise to a cloacal arrangement, von Eiselsberg* first resected the coccyx and made an artificial anus in the sacral region after removing the whole of the new growth. The wound was then drawn together by stitches, and the uterus having been drawn downwards, the cervix was fixed to the skin externally. Rapid recovery occurred; the catamenia were freely discharged externally, and after a short time the motions were perfectly well retained. This bold mode of action is worthy of imitation.

In cases where one cannot hope to remove all the disease, scraping, followed by the use of the actual cantery, is alone practicable, and antiseptis of the vagina should, as far as possible, be obtained by means of sublimate injections and iodoform tampons.

* Von Eiselsberg. Obst. and Gyn. Soc. of Vienna, March 12, 1889 (Centr. f. Gyn., 1889, No. 85, p. 619).

CHAPTER III.

ON VAGINAL FISTULÆ.

Classification. — Urinary fistulæ. — *Ætiology*. — Pathological anatomy. Division. Symptoms. — Diagnosis. — Prognosis. — Treatment. Historical survey. I. Treatment of vesico-vaginal and urethro-vaginal fistulæ. Indications for operation. Direct obliteration of the fistula. Cauterisation. Immediate secondary union. Primary union, method and after-treatment. Indirect obliteration of the fistula. Colpocleisis. Vulvo-rectal obliteration. II. Treatment of cervical fistulæ. 1. Superficial and deep juxta-cervical fistulæ. Vesical hysterocleisis. 2. Intra-cervical fistulæ. Cauterisation. Freshening and suture. Cystoplastic operations. Hystero-stomato-cleisis. III. Treatment of uretero-vaginal and uretero-cervical fistulæ. 1. Method of direct obliteration. Methods of Simon, Landau, and Schede. "Dedoublement." 2. Method of obtaining indirect obliteration. Colpocleisis. Nephrectomy. — Statistics of the operation. Accidents during and after operation. Laceration of the vagina. Hæmorrhage. Wounds and ligature of the ureter. Peritonitis. Calculi. Results. Incontinence of urine; Pawlik's operation. — Fæcal fistulæ. — Recto-vaginal fistulæ. *Ætiology*. Pathological anatomy. Symptoms and diagnosis. Prognosis. Treatment. Operation by the perineum, the vagina, and the rectum. Preliminary and after-treatment. — Entero-vaginal fistulæ. Definition. *Ætiology*. Pathological anatomy. Symptoms. Diagnosis. Treatment. Cauterisation. Excision of the spur. Freshening and suture. Laparotomy and enterorrhaphy. Union of the upper end with the rectum. Formation of a path for the fæces towards the rectum.

THE vagina may have a permanent communication with neighbouring hollow organs by means of orifices or of organised cicatricial paths covered with epithelium. These abnormal communications or fistulæ are to be divided into two varieties, according as they allow the passage of urine or of fæcal material.

URINARY FISTULÆ.

Ætiology. — It is agreed to exclude, definitely, from the class of cicatricial fistulæ, or fistulæ properly so-called, fistulous communications established by cancer at an advanced period of its development.

In the immense majority of cases, fistulæ date from some difficult labour, which has led to sloughing of a portion, more or less extensive, of the generative canal. When the foetal head is too long engaged in the pelvis the vesico-vaginal septum, pressed against the pubis with a considerable degree of force, sloughs if this compression persists for more than a very short time, as in cases of contracted pelvis, extreme size of the child's head, shoulder presentations, &c. It is the duration of pressure much more than its intensity that is the thing to be feared.

The other causes of fistulæ are infinitely rarer :

Wounds of the vesico-vaginal septum by forceps or the cephalotribe, or any other such instrument, have been observed ; sometimes it is the surgeon who has made the perforation, either intentionally as in vaginal section, or accidentally as in hysterectomy.

Vesical calculi * have caused fistulæ by leading to ulceration of a pocket in which they have encysted themselves, or simply by leading to the formation of an abscess at some adherent point. Foreign bodies in the vagina probably only act after having led to the formation of a calculus.†

Ulceration ‡ of the bladder due to chronic catarrh has exceptionally gone on so far as to perforate the septum.

Tubercular ulcers of the vagina are a pathological curiosity, and when they lead to perforation this abnormal opening, unless its edges cicatrise, no more is deserving of inclusion in the category of fistulæ than cancerous perforation.

Pathological anatomy.—The seat of fistulæ, which has been used for the purpose of dividing them into varieties, is variable, and depends upon the situation of the bladder and of the urethra with relation to the brim of the pelvis at the time when the labour pains occur, for it is against the ridge that the pressure occurs which leads to the sloughing. The uterine walls can never be the seat of perforation, for the internal os is always situated above the pubis. But the same is not true of the anterior lip

* Cases of this kind are reported in the classical works of Desault, Richerand, Boyer, Rokitsansky, &c.

† Morand and Jobert (of Lamballe) have reported cases of this.

‡ L. Tait (cited by Schröder. *Dis. of gen. org. of women*, French trans., 1886, p. 519) seems to have seen four cases.—Schröder (*ibid.*) in one case saw the perforation occur under his very eyes.

of the cervix. If this slough, which is rare, there results a fistula between the cervix and the bladder, a vesico-cervical, or, as it has been termed with less exactness, a vesico-uterine fistula. As a rule the external os has passed above the foetal head when the fatal pressure comes into play, and consequently it is brought to bear upon the vesico-vaginal septum, which later is perforated and occasions a vesico-vaginal fistula. Lastly, it may be that the bladder being full at the time has been pushed up above the pubis, dragging the urethra with it; then it is this canal which is perforated, and we have a urethro-vaginal fistula. Verneuil * has termed urethro-cervico-vaginal fistulæ those in which the neck of the bladder and the urethra are simultaneously involved.

The vesical orifices of the ureters are situated about 3 cm. below the infra-vaginal cervix, and these ducts have, as is well-known, a short intra-parietal course in the very substance of the bladder-wall. Consequently one can understand that compression brought to bear at the union of the upper third of the bladder with the lower third of the uterus involves them and leads to the formation of a uretero-uterine fistula (which it would be more exact to speak of as uretero-cervical),† or of a uretero-vaginal fistula, according as the abnormal orifice is situated at the cervix or lower in the vagina.

The most common variety is the vesico-vaginal. It is usually situated very high up in the cul-de-sac, and corresponds with the fundus of the bladder. It is sometimes so small that the greatest pains have to be taken to discover it; at other times it forms a cleft or a gaping orifice, generally oval in shape, and having a transverse or oblique direction, with edges that are sometimes supple, sometimes thick and cicatricial; the border where the two mucous membranes have united may generally be recognised very clearly; that of the vagina is generally a little inverted, forming, to use Verneuil's expression, "a kind of entropion." In the majority of cases there is only one opening, but there may be several separated by fleshy or cicatricial bridges; the vesico-vaginal septum has even been

* Verneuil. *Mém. de chir.*, vol. 1, p. 283.

† Hegar and Kaltenbach (*Treatise on oper. gyn.*, French trans., p. 498) only mention nine published cases.—Bérard was the first to draw attention to cases of this kind.

known to be so extensively destroyed as to cause the formation of what Deroubaix* has called a "uro-genital cloaca."

The vagina often tolerates the constant contact of the urine extremely well, but it may also be the seat of most painful chronic inflammation. This canal sometimes is the seat of cicatricial bands, the result of eschars formed at the same time as the fistula, which lead to its narrowing; in the upper diverticulum which may thereby be formed, there occur in some cases stagnation of urine, and the formation of calculous concretions. One of the most objectionable complications of fistula, by reason of the difficulties which it interposes in the way of treatment, is the existence of cicatricial tissue binding down the vagina very firmly to the bony skeleton. The urethra is sometimes included in these fibrous masses; it is deviated from its course, narrowed, or even obliterated. When the perforation is of some size the bladder, which is freely open, and the mucous membrane of which is irritated by contact with the external air and the vaginal secretions, becomes inflamed; and, further, since it no longer can play its part of a reservoir for the urine it becomes contracted.

In the case of fistulæ situated upon the sides of the vaginal trigone of Pawlik (fig. 84), one may penetrate with a stylet or a suitable sound into the ureter,† which opens either on the free border or a little outside of it, into the bladder; it is probable that in such cases there is present a certain amount of inflammation of the ureters, which could be recognised by digital examination performed according to the directions of Säger. Freund,‡ in an autopsy on a case in which there was a uretero-uterine fistula, found the ureter dilated as in cases of hydro-nephrosis; there was a notable contraction below at the site of the fistula.

Pure uretero-vaginal fistulæ without simultaneous communication with the bladder are very rare. Generally perforation of the ureter is but an epi-phenomenon of vesico-vaginal fistula. In the same way, uretero-uterine fistulæ are only a particular

* Deroubaix. *Treatise on uro-genital fistula in the female*, Brussels, 1870.

† Max. *Ann. of the Brussels Path. Soc.*, 1860, vol. 3, p. 18.—S. Pozzi. *Bull. et Mém. Soc. de chir.*, Feb. 28, 1887, p. 114.

‡ A. G. Freund. *De fistula uretero-uterina, conspectu historico*, Vratislaviæ, 1860, and *Klin. Beiträge zur Gyn.*, J. W. Bettschler, W. A. Freund, and M. B. Freund, Breslau, 1862.

variety of vesico-uterine or vesico-cervical fistulæ, in which, in consequence of the process of cicatricial contraction which follows upon the separation of the sloughs, the opened ureter is fused to the cervix, which is more or less destroyed, and which communicates with the bladder. However, it may happen that after the lapse of a certain time, the portion of the fistula corresponding to the bladder becomes obliterated by progressive concentric contraction, while the portion into which the perforation of the ureter opens is kept open by the incessant filtration of the urine, which comes directly from this duct and persists. Every ureteric fistula therefore is of long standing, and if one may so speak, half cured. Hence arises the difficulty that is often met with in finding the small opening in the pits and under the bridges of the fibrous tissue.

If the fistula be urethro-vaginal it is situated fairly close to the vulva, between 3 and 5 cm. from the meatus. A fistula of this kind has been found in front of a vesical fistula, and the urethra was obliterated between these two orifices. These fistulæ may be very small or of enormous proportions.

The uterus is always affected with metritis in cases of urinary fistula, which keeps the cervix in a constant state of irritation; the infra-vaginal cervix may undergo considerable alteration (sclerosis, ulceration), and in one case that I have seen, it presented the appearance of a nodular cancer.

Symptoms.—When a labour has been difficult or accompanied by violent obstetrical operations, one frequently finds immediately afterwards an involuntary discharge of urine; this may possibly be the result of a laceration of the vesico-vaginal wall, but it may also depend upon a kind of traumatic paralysis of the neck of the bladder which sometimes precedes by several days the elimination of sloughs.

We must therefore not place much reliance on the date that patients assign to the commencement of this accident, and must not conclude, with Deroubaix, that in the majority of cases the fistula appeared immediately after delivery; incontinence of urine and fistula are not in point of fact of necessity contemporaneous, as patients are prone to imagine. It is only about the third or fourth day that the slough is sufficiently soft to allow of the passage of the urine by a kind of filtration which at first is insensible, but which increases in abundance in proportion to

the degree of separation of the slough ; sometimes considerable delay has been known to occur in this work of separation, which may be prolonged over a month. The quantity of urine which escapes is proportionate to the size of the opening ; alterations in quality (muco-pus, phosphates) depend upon concomitant cystitis. The attitude of patients has a great influence upon the discharge of urine. Some can succeed in retaining it if they press their thighs together. Verneuil* saw one woman from whom it escaped if she lay on her side. Further, we can understand that a fistula implicating the fundus of the bladder allows of the retention, in the upright position, of fluid which would immediately escape if the vesical perforation were situated at the neck. The arrangement of the lips of the wound, neighbouring bands, &c., may also greatly affect this phenomenon.

In urethro-vaginal fistulæ the urine is only discharged into the vagina during micturition. In uretero-vaginal or uretero-uterine fistulæ, the urine secreted by one of the kidneys accumulates as usual in the bladder, while that secreted by the other kidney filters drop by drop or in a small stream into the vagina.

The perpetual and involuntary oozing of this liquid is, in vesico-vaginal fistulæ, a veritable penance for the women, who are always wet, and give off a penetrating and most unpleasant smell, which nothing can overpower, and whose vulvæ and thighs are the seat of most painful irritation.

The general health may be satisfactory, but may also be profoundly modified under the influence of ascending inflammations of the genito-urinary apparatus, metro-salpingitis, or pyelo-cystitis. Amenorrhœa has often been noted.† Nevertheless impregnation and normal parturition may occur.

Diagnosis.—At first, when the woman has just been delivered, one must not hasten to conclude that a urinary fistula has been formed because the urine escapes involuntarily ; this may, as I have already said, arise from the fact that there is temporary paralysis of the neck of the bladder or of the viscus itself, with secondary engorgement. Careful examination must be made, and if there be the slightest doubt, the bladder should be emptied and an injection of water coloured with milk made into it ; this

* Verneuil. *Loc. cit.*, p. 779.

† Kroner. *Arch. f. Gyn.*, 1882, vol. 19, p. 149.

will settle the diagnosis: if there be the least perforation the liquid will return by the vagina.

Digital examination is sufficient in the case of large fistulæ, particularly if a metallic sound be passed into the bladder at the sound. But specular examination is indispensable for obtaining precise information, and also for the discovery of some very small perforations. The woman must be placed successively in the lateral (Sims') position, and in the genu-pectoral position, while at the same time the fourchette is depressed and the folds are drawn out of the lateral vaginal walls with suitable retractors. The last mentioned position is the best for obtaining a good view of the anterior wall, provided that at the same time care be taken to fix the cervix with forceps and draw it slightly downwards. Examination is, however, very difficult if the vagina be narrowed, and then it is necessary to dilate it first of all, either slowly or rapidly, according to the methods which I shall describe when dealing with the question of treatment.

Even when the vagina is sufficiently capacious, a view may not be obtainable on account of bridges and rugosities resulting from the cicatrization of eschars. Under these circumstances small sharp hooks will be of assistance, and a fine probe should be passed into any suspicious-looking pit or depression. At the same time a metallic sound is to cause the anterior vesical wall to become more prominent, and the woman must be made to bear down so as to put it still more on the stretch.

In doubtful cases the surgeon should not neglect to inject milk into the bladder. If the interior of the vagina be examined immediately after, the milk will be seen to emerge from the opening. If the opening, however, be extremely small, it is possible for the oozing to take place, but for its point of emergence to be invisible. I then advise that the anterior vaginal wall should be thoroughly dried, and that a piece of blotting paper should be placed upon it while the bladder is refilled. A spot of moisture will immediately be seen at the very site of the orifice, which previously could not be found, and which henceforth would be more easily sought by means of a fine probe. If the fistula be cervico- or utero-vaginal, the introduction of a sound into the bladder and of a probe into the cervix will be sufficient for the discovery of a fairly large perforation. But if

it be very small it will be discoverable on injection of milk into the bladder; the fluid will be seen to emerge by the cervix. The diagnosis will be confirmed by dilating the cervix and exploring the cervical canal at the same time as a sound is passed into the bladder.*

In the case of a uretero-uterine fistula the urine also escapes by the cervix, as in the preceding variety, and a differential diagnosis is at first impossible. Very minute examination is necessary before it can be made. Injection of milk into the bladder will not return by the cervix (unless the fistula be uretero-vesico-uterine). Obliteration of the cervix by a laminaria tent, with the object of dilating it and facilitating examination, would be followed, as in a case seen by Freund,† by pain in the kidney, with vomiting and fever, resulting from obliteration of the orifice of evacuation of one of the kidneys. An ingenious method has been adopted by Bérard: he told the patient to pass water, and then placed her on a receptacle to collect all the liquid which passed by the vagina; after two hours the catheter was passed, and the quantity of urine thus removed was compared with that which had spontaneously flowed into the receptacle; the two quantities being equal, it was concluded that they came one from each of the kidneys.

I believe that in such a case evidence of thickening of one of the ureters by digital examination according to Säger's method would confirm the diagnosis, as it would show that there had been inflammation of the ureter on the side of the lesion. Catheterisation of the ureters by Pawlik's or Simon's method might also bring us into the cervix uteri. Nevertheless it must be remembered that the ureter contracts below the perforation, and may consequently be no longer easily permeable.

A uretero-vaginal fistula will be suspected if the orifice be situated at a distance of one or two centimetres from the cervix on the side of the vagina close to one of the lateral portions of Pawlik's triangle (fig. 84), and also when it has been the object of numerous tentative operations which have failed to procure relief in spite of the skill of the operators. When the fistula is purely uretero-vaginal the opening is very small and has

* Nélaton. *Surgical Pathology*, vol. 5, p. 485.

† Freund. *Klin. Beiträge zur Gyn.*, 1882, p. 84.

abrupt edges, or is surrounded by a small projection; when, as is more commonly the case, it is uretero-vesico-vaginal the opening may be very large, and it is on one of the lips that the opening of the ureter must be sought, the relations of the duct being borne in mind. The urine has sometimes been seen to gush out in jerks. An endeavour should always be made to introduce a ureteric sound (fig. 85), even if one have to grope one's way on the posterior border, and do not see the opening. Deep penetration of the catheter in the direction of one of the kidneys and the issue of limpid urine from its open extremity in spite of injection of milk into the bladder will remove all doubt. I was able in a case of this kind to introduce Pawlik's sound for a distance of 21 cm.

Examination of the urethra by passage of a catheter must always be performed with the greatest care. A small gum-elastic catheter should be used, on account of the deviations in position which the duct may have undergone. A mistake mentioned by Hegar and Kaltenbach must be guarded against: the urethra being obstructed in the posterior portion between a urethro-vaginal and a vesico-vaginal fistula, the catheter introduced by the urethra was seen to leave it, penetrate into the vagina through the urethral opening, and return into the bladder by the vaginal opening. A little care would prevent this mistake from being made. The cervix uteri affected with chronic inflammation is sometimes hard, bossy, increased in size, and presents an ulceration with precipitous edges, and a varnished appearance similar to that obtaining in certain varicose ulcers of the leg, which raises a suspicion that the disease is malignant. The surgeon must not be in a hurry to conclude that he has to deal with cancer of the cervix; these conditions will disappear, or at all events will be considerably improved, directly the fistula has been obliterated.

Prognosis.—Spontaneous cure of urinary fistulæ* can only occur at the commencement of their formation, and when the process of concentric cicatrisation which follows upon the elimination of the sloughs has not become exhausted; we may then be surprised at the rapidity with which large perforations diminish in size or disappear. But after a certain time fibrous contraction having come to an end, and the opening being perfectly

* Nélaton. *Loc. cit.*, p. 507.

circumscribed by the epithelium of the two mucous membranes, which becomes one on its free edges, the condition becomes permanent, and has no longer a natural tendency to recover. These fistulæ are rather an infirmity than a disease: what causes their eventual danger is the occurrence of inflammatory complications which may arise on the side of the bladder and of the uterus, and thence extend upwards to the kidneys, or to the tubes and the peritoneum. Fistulæ of the ureter, those which open into the cervix uteri are particularly dangerous from this point of view.

As regards the curability of the various kinds of fistulæ, it differs greatly with their seat, extent, duration, and the changes that have simultaneously been produced in the vagina.

Fistulæ of the fundus are easier to obliterate than cervico-vesico-vaginal fistulæ, and even than urethro-vaginal fistulæ, which, *a priori*, would appear to be easily amenable to treatment; this depends upon the suppleness or the slighter degree of laxity of the neighbouring tissues. Vesico-cervical fistulæ are very resistant to treatment. All fistulæ implicating the ureters, whether vaginal or cervical, also present peculiar difficulties, and their obliteration even exposes to dangers, if the operation compromise in the least degree the patency of the renal excretory duct.

Treatment. Historical survey.—Urinary fistula in the female was described at the end of the sixteenth century by Séverin Pineau.* Its treatment by freshening and stitching was even recommended in the seventeenth century by the Dutch surgeon van Roonhuyzen;† but these operations had failed from the lack of a good method. In the eighteenth century all curative treatment was abandoned; Jean Louis Petit‡ adapted a kind of urinal that he called a “trou d’enfer.” Desault and Chopart§ contented themselves with inserting a retention-catheter and applying a vaginal tampon as soon as possible, to favour spontaneous cicatrization. At the commencement of the nineteenth

* Sév. Pineau. *Opusc. physiol. anat., &c.*, Paris, 1598.

† Henry van Roonhuyzen. *Heelkonstige Aanmerkingen betr. de Gebreken der Vrouwen*. Amsterdam, 1668. This monograph was translated into English in 1676 (*Philosoph. Trans.*, vol. 11, p. 621).—In the eighteenth century, Fatio, of Baale, and Voelter, again attempted suture, but without success.

‡ J. L. Petit. *Treatise on Surg. diseases, &c.* Paris, 1790, vol. 8, p. 87.

§ F. Chopart, *Treatise on diseases of the urinary tract*. Paris, 1821.

century* various kinds of operative procedures were attempted. Delpéch, Dupuytren, and Jules Cloquet, recommended cauterisation. Suture was again tried by Lewisky in 1802, by Nägele in 1812, by Lallemand, by Deyber, by Malagadi (of Bologna), in 1828, by Roux in 1829, and by Dugès in 1830. In 1824 Lallemand† invented his famous "sonde-érigne," a sound for the co-aptation of the edges of the fistula after they had been freshened by cauterisation. Lallemand's alleged successes, though they were very much contested, led to a sort of infatuation for hooks and instruments formed on that principle. Dupuytren‡ had a similar instrument made, and Laugier§ a little later invented a double vaginal co-aptation instrument with hooks; Récamier also had several instruments made, but they soon passed out of fashion and gave way to autoplasmic operations. It was in 1832 that Velpeau conceived the idea of closing laryngeal fistulæ with a layer of integument, and suggested the same method of dealing with other fistulous openings. This suggestion was acted upon by Jobert (of Lamballe),|| and in 1834 he performed "elythroplasty," or an autoplasmic operation on the vagina by the Indian method. He first freshened the edges of the fistula with the knife, and then made up the loss of substance

* This history has been treated in a masterly manner by Rochard. *History of French surgery in the nineteenth century*. Paris, 1875, pp. 387-394 and 839-843.— Cf. also Jobert (of Lamballe). *Vesico-vaginal fistulæ and their treatment by a new operative method* (*Gaz. méd. de Paris*, 1836, p. 193).—Velpeau. *New elements of operative medicine*, 2nd edit., 1839, vol. 4, p. 433.

† Lallemand (of Montpellier). *Reflexions on the treatment of vesico-vaginal fistula* (*Arch. gén. de méd.*, April, 1825, 1st series, vol. 7, p. 481). The "sonde-érigne" is also described and figured by Sédillot and Legouest. *Treatise on operat. med.*, 1870, vol. 2, p. 552 (fig. 561).—Deville (*Thesis Montpellier*, 1833, No. 107) published two cases of recovery by Lallemand's method.—Serre (On the use of the "sonde-érigne" in the treatment of vesico-vaginal fistulæ paper read before the medical society of Montpellier, June 15, 1840, in *Gaz. méd. de Paris*, 1840, p. 487) asserted, on the other hand, that in fifteen cases occurring in twelve years at the St. Eloi Hospital under Lallemand, he counted five deaths and not a single cure. However, Bréchet (*Gaz. méd.*, 1840, p. 651) read a little later, to the Academy of Science, a report on a paper of Lallemand's, in which he admitted the reality of seven cures obtained out of fifteen cases.

‡ See Velpeau. *Loc. cit.*, p. 440.

§ Laugier. A new instrument for the union of vesico-vaginal fistulæ (*Journ. hebdom.*, 1829, vol. 5, p. 420).—This instrument is described and figured in Sédillot and Legouest, *loc. cit.*, vol. 2, p. 552 (fig. 562).

|| Jobert (of Lamballe). Paper read before the Academy of Science, Feb. 4, 1836 (*Gaz. méd. de Paris*, 1836, vol. 4, p. 225), and report of Blandin, *Bull. Acad. de méd.*, March 27, 1838, vol. 2, p. 581;—*Treatise on plastic surgery*, Paris, 1849, vol. 2, p. 409;—*Treatise on vesico-uterine, vesico-utero-vaginal fistulæ, &c.*, Paris, 1852.

by a strip of skin taken either from one of the labia majora or the internal surface of the thigh or the nates. This strip was kept in contact with the freshened fistula by a thread passing down the urethra. The case was perfectly successful, but he, and Roux also, had many failures afterwards. Velpeau,* Leroy d'Etiolles,† and Gerdy‡ also invented an autoplasmic method. This latter, which still is useful in special cases, consists in cutting two quadrilateral flaps along the sides of the perforation, and in carefully joining together the two large bleeding surfaces. All these clumsy operations had only yielded doubtful results. It was then that Jobert§ proposed an operation which marks an epoch in the history of the treatment of fistulæ, viz., cystoplasty by sliding of the flaps or a vaginal autoplasmic operation by locomotion ("cystoplastie par glissement" or "autoplastie vaginale par locomotion"). It consisted in separation of the vagina at its insertion into the cervix, and in free liberating incisions. To this he first of all added freeing of the anterior lip of the fistula by detaching the urethra from the pubis, but he very soon omitted this step. In this way he obtained a series of successful cases that was quite extraordinary for the time at which he lived. Jobert attributed them, but wrongly, to the ease with which the edges of the perforation could be brought together and to the absence of tension; in reality the greater part depended upon details in the method which he regarded as accessory, but the importance of which was capital; they were, the obtaining of more room by the use of flat retractors, very free freshening of the edges of the fistula, and multiplication of the number of stitches inserted. From this error of appreciation it resulted that the surgeons who adopted his method without attaching the same importance to details which they regarded as insignificant, for the most part met with failure, and the successful cases of cystoplasty by sliding of the flaps were almost confined to those of its originator.

In the first enthusiasm, therefore, excited by Joubert's

* Velpeau. *Loc. cit.*, vol. 1, p. 702.

† Leroy d'Etiolles. New methods of treatment of vesico-vaginal fistulæ (*Comptes rendus de l'Acad. des Sciences*, August, 1842).

‡ Gerdy. *Rev. scient. et industr.*, 1841, vol. 5, p. 454.

§ Jobert (of Lamballe). *Bull. de l'Acad. de méd.*, meeting of March 16, 1847, vol. 12, p. 492.—Malgaigne. *Text-book of operative medicine*, 7th edit., p. 769.—Monteros. *Essay on the treatment of genito-urinary fistulæ in the female*. Thesis, Paris, 1864.

publications, there had followed in Europe complete discouragement when at the end of 1858 a young American surgeon, Bozeman* (of Montgomery), introduced into Paris the method adopted by his master, Marion Sims,† but slightly modified. This American method, of which scanty elements have been discovered elsewhere, and of which Hayward‡ (of Boston) in particular had indicated one of the essential points, combined a number of great improvements, viz., more convenient position of the patient in lateral semi-pronation, the use of large concave metal retractors serving not only as retractors, but also as reflectors of light, incomparably greater extent of freshening than had hitherto been practised by means of quite a large and ingenious armamentarium, stitches of silver wire (not only strong but aseptic) inserted very close to one another, and the use of a special kind of metal catheter which could be left *in situ*.

The extraordinary successes obtained by Bozeman in the hospitals of Paris fired the ardour of French surgeons; Follin and Verneuil in particular, by their publications and their practice, brought the American method into general use.§

* Robert (Gaz. des Hôp., 1859, pp. 1 and 5) has described the method that Bozeman adopted in the operations that he performed at the Paris hospitals.—N. Bozeman. Remarks on vesico-vaginal fistula, &c., Louisville Rev., 1856, p. 75;—Ann. de Gyn., 1876, vol. 6, p. 106.

† M. Sims. On the treatment of vesico-vaginal fistula (Amer. Journ. of Med. Sci., Jan., 1852, vol. 23, p. 59);—Silver sutures in surgery, New York, 1856.

‡ G. Hayward (of Boston) Amer. Journ. of Med. Sciences, 1839, p. 283;—Boston Med. and Surg. Journ., 1851, vol. 44, p. 209.

Metallic suture with lead wire had already been practised by Mettauer of Virginia (see Follin, *loc. cit.*). But in reality freshening of a large surface (Hayward) and metallic suture (Mettauer) had been quite passed over without notice when Sims united them to the various elements which constituted his method. One cannot detract from the merit of Sims, who really initiated the operation.

Cf. on the questions of priority raised by these methods, A. Verneuil. Improvements in the operations for vesico-vaginal fistula introduced by American surgeons (Gaz. hebdom., 1859, p. 121).—Follin. Examination of some new operative methods for the cure of vesico-vaginal fistula (Arch. gén. de méd., 1860, 5th series, vol. 15, p. 459).—J. Herrgott. Historical study of the operative treatment of vesico-vaginal fistula, and examination of certain improvements recently introduced (Gaz. méd. de Strasbourg, 1863, pp. 119 and 142).

§ Verneuil. Note on two vesico-vaginal fistulæ operated upon and cured by the American method (Bull. de l'Acad. de méd., 1860, vol. 36, p. 173).—Fresh observations on vesico-vaginal fistula, with remarks on the American methods of treatment (Arch. gén. de méd., 1862, 5th series, vol. 19, p. 48);—On vesico-vaginal fistulæ that are difficult to reach, and the means suitable for overcoming this complication (Bull. de thérap., 1862, vol. 62, pp. 442-497).—Bourguet (of Aix). Simple method of lowering the vesico-vaginal septum (*ibid.*, p. 72).—Heraud (of Lyons). Remarks on the American operation for vesico-vaginal fistula, with Desgrange's moniliform suture;

Three years later (November, 1861) Marion Sims * himself came to Paris, and operated in Velpeau's wards. At the same time Baker-Brown † and Simpson ‡ were obtaining in London and in Edinburgh similar successes, and Simon § (of Rostock) further made improvement in the operative details. He used silk ligatures, thus showing that silver wire played but a small part in obtaining the magnificent successes; he gave definite precepts for the freshening; and lastly, for cases inoperable by the ordinary method he invented the method of *colpocleisis*, or transverse obliteration of the vagina, the first idea of which had been in reality conceived by Vidal de Cassis. ||

The treatment of urinary fistula in the female was henceforth settled, and more recent works have scarcely done more than add some further improvements in detail. If a general glance be taken of the history of operations for vesico-vaginal fistula, several periods can easily be distinguished: 1st, an old or "groping" period, which stretches from the remarkable attempt at suture of van Roonhuyzen to the first attempts of Joubert, during which the evolution of surgical ideas passes successively from the conception of suture after freshening to that of cauterisation, thence to that of co-aptation instruments after freshening with caustics,

three successful cases (*ibid.*, 1863, vol. 69, pp. 61, 113, 207).—A. Courty (of Montpellier).—Six operations for vesico-vaginal fistula by the American method, all followed by immediate cure (*Montpellier méd.*, 1865, p. 316);—Six other operations, &c. (*ibid.*, 1867, p. 498).

* For the description of the American methods, see Fl. Churchill. *Practical treatise on the diseases of women*, French trans., Paris, 1871, p. 967.—A. le Blond. *Elementary treatise on surgical gynecology*, Paris, 1878, p. 405 and foll.

† Baker-Brown. *Surgical diseases of women*, London, 1861, pp. 112-174.

‡ Simpson. *Clinical lectures on diseases of women* (Amer. edit.). Philadelphia, 1863, pp. 21-40.

§ Simon. Ueber die Heilung der Blasenscheidenfisteln durch blutige Naht. Rostock, 1862;—*Deutsche Klin.*, 1868, No. 45, p. 405, and No. 46, p. 417.

|| Vidal de Cassis. Obliteration of the orifice of the vagina as treatment for vesico-vaginal fistula (*Ann. de la chir. franç. et étrangère*, 1844, p. 208).—This surgeon thought that failure in operations for fistula arose from insufficient size of the bladder: it was with the idea of forming a kind of supplementary cavity for the urine that he sutured the labia majora; he failed, however.—A. Bérard also had an unsuccessful case which was followed by death. Its communication to the Academy of Medicine raised a very heated discussion.—Consult A. Bérard. On obliteration of the vagina applied to the treatment of vesico-vaginal fistula; method of treatment by infibulation or obliteration of the vagina (*Bull. de l'Acad. de méd.* meeting of Feb. 4, 1845, vol. 10, p. 407);—Discussion meetings of Feb. 18 and 25, and March 4 (*ibid.*, pp. 413, 427, 455).—Vidal de Cassis. Account of the discussion at the Academy on obliteration of the vagina for the cure of vesico-vaginal fistulae indirect method (*Ann. de la chir. franç. et étrang.*, 1845, vol. 14, p. 5.).

and lastly to the idea of autoplasmic operations; 2nd, a transition period marked by the method of cystoplasty by locomotion by Joubert, and by the indirect method of infibulation introduced by Vidal de Cassis and followed by Bérard; 3rd, a renaissance period for van Roonhuyzen's old suture operation, with which are associated the names of Hayward, Marion Sims, and Bozeman in America; Simpson and Baker-Brown in England; Simon and Hegar in Germany; Neugebauer at Warsaw; Follin and Verneuil in France, &c.

Vesico-vaginal and urethro-vaginal fistulæ.—What is the proper time for operating? Hegar and Kaltenbach fix the most favourable time between the sixth and eighth weeks after parturition. By this time the lochia have ceased, the sloughs have separated, and the edges of the fistula are sufficiently vascular and firm. Earlier there would be a risk of having the wound contaminated by the vaginal discharge and of operating upon friable and engorged tissues; later the surgeon finds himself in the presence of retracted and fibrotic tissues. Age is no contra-indication; Simon operated successfully on a child of eight years, in whom the fistula had been produced by a large vesical calculus; Hegar on a woman aged sixty who had suffered from a fistula for thirty-five years.

A bad state of general health is evidently a faulty condition for the success of this plastic operation. Hegar, however, undertook a case occurring in a hemiplegic patient. In spite of Watson's and Baker-Brown's* successful cases, it seems to me to be very unwise to operate during pregnancy. By preference, the days immediately following on menstruation should be taken.

In every case of vesico- or urethro-vaginal fistula incontinence of urine can be stopped, first, by directly obliterating the fistula; or second, by obliterating beneath the fistula the genital canal, which is thereby made an accessory urinary reservoir.

This method is evidently only a last resource.

I. *Direct obliteration of the fistula.*—I shall not delay to consider at length the use of caustics, which were long the only resource of surgeons, and of which the most varied kinds were used. They should be reserved for recent small fistulæ, and particularly for those which present a small canal with an oblique direction. By preference the galvano-cautery should be used,

* Watson, Baker-Brown, cited by Hegar and Kaltenbach. *Loc. cit.*, p. 500.

the platinum loop of which should first of all be introduced cold throughout the whole length of the canal. Nitrate of silver has been sufficient when the opening has been very narrow; it is a useful adjuvant to the actual cautery when the eschar that the latter produces has separated.

Immediate secondary union.—In an intermediate section between cauterisation and suture may be placed the mixed method, of freshening by caustics and then suturing. This method sometimes called “immediate secondary union,” has been brought chiefly into general use by Amabile* (of Naples). The following is taken from his description of the operation :—

The patient being placed in the dorsal position, the thighs are well raised, and the surgeon obtains a view of the fistula by means of a modified Sims’ speculum, which is fixed to the operation-table, and is somewhat similar to that invented later by Fritsch (fig. 61). When the fistula is plainly visible, its lips and edges are scarified for an extent of about 1 cm. The object of this scarification is to allow of the more energetic action of the caustic. Amabile uses sulphuric acid for freshening by caustics, and he brings it into contact with the tissues by means of asbestos contained in small perforated spoons. The caustic is again applied after three days, and then nitrate of silver is used to facilitate the separation of the sloughs. By the twelfth day a granulating surface is obtained, which is brought together by Amabile’s co-aptation hooks. These hooks are left *in situ* for 5 to 7 days.

We have here evidently a reversion towards the old-fashioned methods of Lallemand, Laugier, &c. Experience has caused it to be discarded as a general method. Nevertheless we cannot blink the fact that immediate secondary union may be of use under some special circumstances. For example, if one have to treat a perforation in the first days following upon separation of the sloughs, an attempt may be made to unite directly the granulating surfaces; for this purpose, however, stitches seem to me to be preferable to clamps or hooks.

Primary union of the fistula, which has been previously

* L. Amabile. *La fistola vescico-vaginali*. (Movimento. Naples, 1874, pp. 369 and 417.)—New method of treatment for vesico-vaginal fistulæ (Compte rendu du Congrès périod. des sciences méd., Brussels and Paris, 1876, p. 842).—For detailed accounts of the methods see Le Blond. *Loc. cit.*, p. 889 and foll.

freshened, constitutes the general method which has definitely taken the place of its predecessors.

Preparatory treatment.—To Bozeman belongs the credit of having shown the extreme importance of preliminary dilatation of the vagina in cases in which there is narrowing of this canal, together with the presence of cicatricial bands. To obtain this result, the American surgeon distends them gradually by means of a series of ovoid balls made of hardened gum, and introduced several days previously into the vagina; at the same time incisions are made into the cicatricial masses. With patience surprising results are obtained thereby. Simon and his pupils prefer extemporaneous dilatation; a series of incisions are made with the knife in the bands and the fibrous portions, and one after another specula of increasing sizes are introduced. Local anaesthesia may be obtained by means of cocaine.

It is no less advantageous to cure completely, before under-



Fig. 384.—Neugebauer's speculum for operations on vesico-vaginal fistulae.

taking the plastic operation, any erythema, or excoriations, or cystitis, by means of lotions, injections, baths, &c.

If there exist narrowing or obliteration of the urethra, this should be treated before attacking the fistula itself. For this, forcible dilatation, followed for a considerable length of time by the passage of sounds, will be necessary. If the urethra be obliterated, an operation similar to external urethrotomy in the male must be performed. The masses of fibrous tissue should be excised, and then the vaginal mucous membrane, sufficiently freed by incisions and by suitable dissection, should be stitched over a retention catheter so as to form a fresh canal.

Technique of operation. 1st Stage: *bringing the fistula into view.*—The position in which the patient is to be placed may vary according to the depth at which the opening is situated. The dorso-sacral position will suffice if the fistula be quite close to the outlet of the vagina, or if there is at the same time some

slight prolapse of the mucous membrane. Generally, however, manipulations can only be carried on with ease if the patient be made to assume Sims' position (lateral decubitus with semi-pronation ; fig. 63). Lastly, for fistulæ situated very high up the

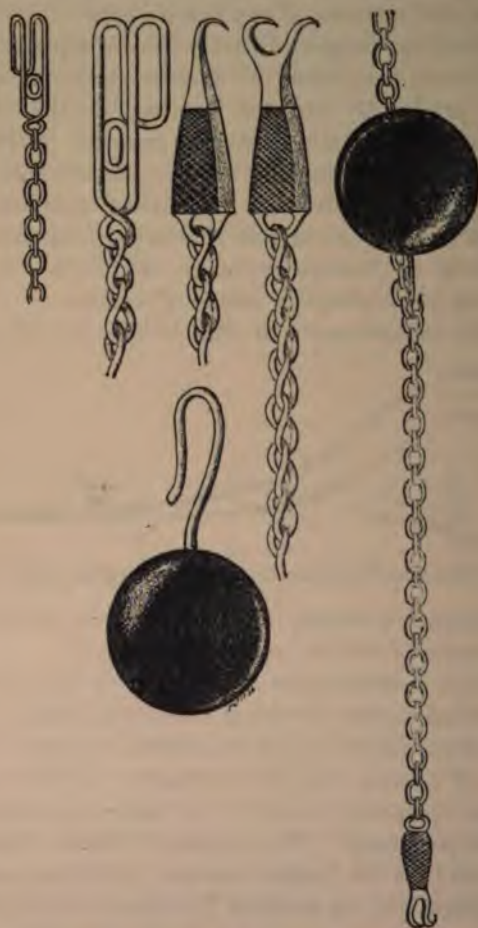


Fig. 385.—Neugebauer's hooks for use in operations on vesico-vaginal fistula.

genupectoral position is preferable. It has the disadvantages of being somewhat painful and of making it more difficult to administer an anæsthetic, in spite of the special tables on which

Bozeman * ties and Neugebauer † places the patients. The last-named also uses a speculum fixed by a belt, for the purpose of putting the vaginal walls on the stretch, and hooks with chains on which weights are hung, so as to keep the parts about the field of operation well on the stretch (figs. 384, 385, 386, and 387). General anæsthesia with chloroform has hitherto been the practice; but it is probable that cocaine, by painting or submucous injections, will in the majority of cases supersede it; I have thus used cocaine successfully. Two assistants are then sufficient, one to keep the vaginal walls on the stretch and sponge away the blood, and the other to take charge of the sutures. The operation may be carried on with continuous irrigation of warm sterilised water;



Fig. 386.—Neugebauer's speculum in position. Position of the patient on the operation-table.

if necessary, too, little balls of damp absorbent wool mounted on forceps may be used in the place of sponges. The fourchette must be depressed with a short and broad Simon's retractor; if necessary, the anterior vaginal wall may be drawn upwards. A metal catheter introduced into the bladder will approximate it to the field of operation. Lastly, the cervix is to be fixed and drawn downwards by means of Museux's forceps.

* See for a picture of Bozeman's table, Le Blond, *loc. cit.*, p. 418.

† F. L. Neugebauer (*Arch. f. Gyn.*, 1889, vol. 34, part 1, p. 145, and *ibid.*, part 3, p. 411 to p. 421) has represented the apparatus used by his father;—he always used to operate with the patient in the genupectoral position.

2nd Stage: freshening of the lips of fistula.—By preference, knives with a straight blade or one set at an angle should be used. Scissors, of which Sims has ingeniously varied the curves, are, as a matter of fact, a little more expeditious, but they have the disadvantage of slightly bruising the tissue. The tissues may be freshened in two ways; in ordinary cases if the mucous membrane is healthy in the neighbourhood of the opening a deep funnel-shaped fresh surface should be cut, according to Simon's

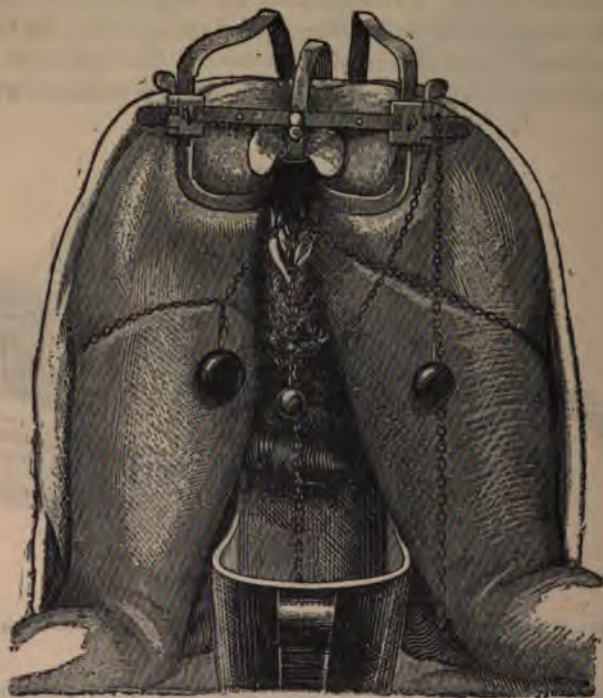


Fig. 387.—Neugebauer's speculum and retracting hooks in position.

method (fig. 390, *m, n*), not respecting in any particular way the vesical mucous membrane, and the knife should remove all the cicatricial tissue; in cases where there is a large amount of scar tissue it is better to freshen the tissues by the second or American method (fig. 390, *x, y*). The knife, held obliquely, is to be thrust in at a distance of from 6 to 8 millimetres from the edges of the perforation in such a way that its point enters the tissues at the junction of the vaginal and vesical mucous mem-

branes, and gives a wide margin to the cicatrised portions which are to be removed. The Americans lay much stress upon the importance of not wounding the vesical mucous membrane, which bleeds considerably if injured. With the assistance of sharp hooks and toothed forceps to keep the mucous membrane



Fig. 388.—Instruments for freshening and suture in vesico-vaginal fistula.

1, 2, 3, straight, convex, and "coude" knives; 4, spatula; 5, 6, blunt and sharp hook; 7, 8, wire-twisters of Coghill, and S-shaped of Denonvilliers; 9, Collin's spring forceps.

on the stretch, a complete collar is thus traced around the fistula, and its satisfactory removal is carried out by means of scissors (fig. 389). In cases where the edges of the fistula appear to have only a moderate amount of vitality, are but little

vascular, and fibrous, the freshened surface should be increased in extent by removing a ring of mucous membrane of from 2 to 3 centimetres in width; this American method has only one disadvantage, viz., that of exposing the parts to some considerable traction after the stitches have been put in.



Fig. 389.—Freshening of a vesico-vaginal fistula.

(To simplify the cut, the forceps that fix the cervix uteri are not figured.)

With small fistulæ, the direction of the freshening should be slightly elliptical in that direction in which the stitches will exercise the least tension. If care be taken to implicate the vesical mucous membrane as little as possible, sub-mucous

hæmorrhages will be avoided, but it is sometimes impossible to avoid wounding an arteriole; the bleeding may often be arrested by pinching the freshened tissue between the fingers. If this do not succeed, it is better to trust to the pressure of the stitches

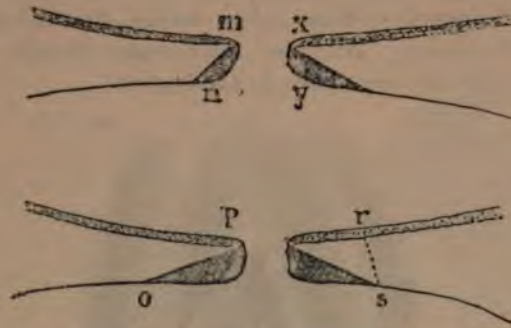


Fig. 390.—Freshening of a vesico-vaginal fistula.

m, n, Simon's method; funnel-shaped freshening with a small base; *x, y*, conical freshening with a large base (American method), sparing the vesical mucous membrane; *p, o*, freshening by the American method, showing the saving of tissue effected when a large cicatricial surface is freshened in this way; Simon's method would necessitate the making of the incision along *r, s*.

for the arrest of hæmorrhage than to use artery-forceps in the wound.

In the way that I have just pointed out vesico-vaginal and urethro-vaginal fistula are to be freshened.

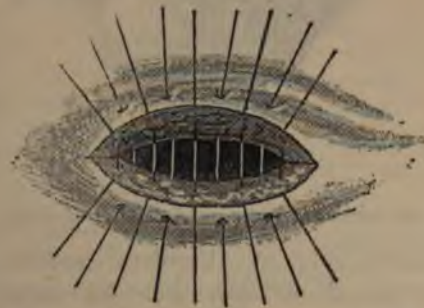


Fig. 391.—Suture of vesico-vaginal fistula; the deep and superficial stitches inserted.

When the fistula is quite close to the cervix it may be advantageous to incise the anterior lip of the cervix, or even to excise a wedge-shaped portion so as to give free access to the fistulous

opening. The tissues should then be freely freshened all around, and if there be any tension, rather than make liberating incisions, the surgeon should separate the mucous membrane with scissors for a certain extent around the edges of the wound (fig. 393).

3rd Stage: suture.—Many operators use needles mounted on holders; Simpson's or Sims' hollow needles, Startin's needles, or Reverdin's needles. All these instruments, though very convenient, make too large holes in the tissues.



Fig. 392.—Suture of vesico-vaginal fistula; the stitches tied.

I use exclusively fine flat Hagedorn's needles and my own needle-carrier (figs. 21 and 22). Fine and strong silk or silver wire is better for this purpose than catgut, which is absorbed too quickly; horse-hair is too stiff.

The surgeon should begin by inserting a series of deep stitches, beginning 5 mm. from the bleeding edge, and passing beneath the whole of the raw surface, but respecting the vesical mucous

membrane. Forcippresure forceps should temporarily be placed on the ends of these threads. Between these deep or supporting stitches are to be placed superficial stitches especially intended for accurate apposition of the surfaces; these latter should be of the finest material, should be inserted as near as possible to the wound, and should be tied at once (fig. 391). Then, and not till then, are the deep stitches to be tied. If silver wire be used, it may be gently twisted, and afterwards tightened with a wire-twister (fig. 388, 7, 8). The insertion of the stitches will be facilitated by the assistance rendered by toothed forceps, a blunt hook, and of a sharp hook or a small instrument fashioned on the model of a pitchfork; a sound is to be kept in the bladder. If it be possible to choose the line of direction of the stitches, the transverse direction should be chosen; if the perforation be very extensive, it may be useful to form a Y-shaped incision, or one like two Y's joined by the feet (fig. 394).

Various modifications of the operation.

—I have just described the general process of freshening and of suture, which in its essential points constitutes that which with Verneuil and Follin we must call the American method.

Some special circumstances may necessitate a modification of the operation. I will very briefly describe them. I will also point out some peculiarities in the practice of certain operators which cannot be passed by in silence.

1st Stage: exposure of the fistula.—In order to diminish the number of assistants, some operators have used specula designed for the purpose of keeping the vaginal walls on the stretch automatically. Bozeman was the first to invent an instrument of this kind (fig. 72), which has served as a model for numerous modifications. Neugebauer's apparatus (fig. 384) is fixed on



Fig. 393.—Operation for a vesico-vaginal fistula in the neighbourhood of the cervix.

Incision of the anterior lip of the cervix to render the fistula accessible.—The dotted inner line indicates the surface to be freshened around the fistula. The dotted lines *A B*, *A' B'* indicate the position at which the mucous membrane may be separated, if necessary, to avoid tension. The patient is supposed to be in the genupectoral position.

the back of the patient by straps (fig. 386). Hooks provided with chains to which weights are suspended also serve to keep the parts tense without the help of assistants (fig. 385). Simon used to lower the cervix by means of threads passed across the lips, which take up less room than forceps. Most surgeons who fix the cervix (and this seems to me to be indispensable) use Museux's forceps, or some other similar kind. Forceps may also be used instead of sharp hooks for the purpose of keeping

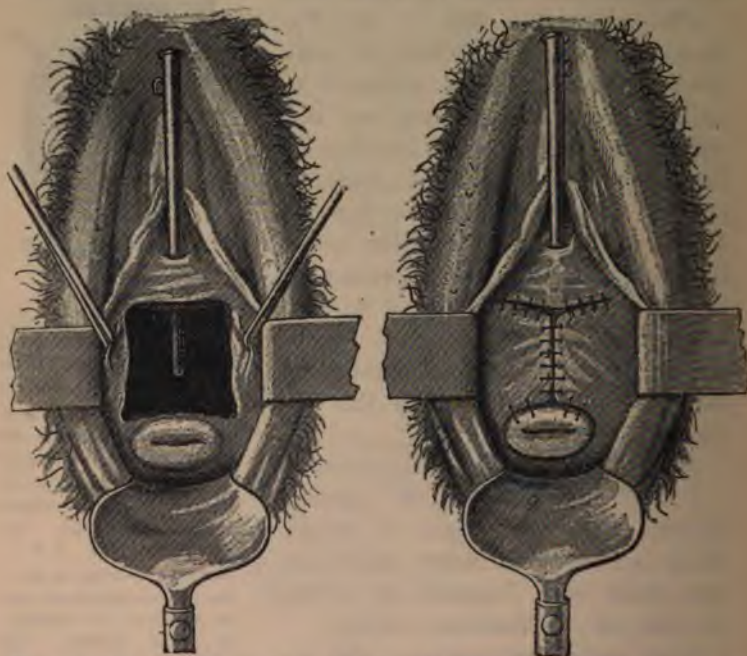


Fig. 394.—Very extensive vesico-vaginal fistula of quadrilateral shape; before and after freshening and suture.

the mucous membrane tense around the field of operation (fig. 389).

*2nd Stage: freshening.**—If the perforation be a very large one, or again, if the edges be extremely vascular, it is well not

* Bardenheuer (Centr. f. Gyn., 1892, No. 5, p. 95) has proposed, in cases of very large fistula, in which the edges of the loss of substance are, so to speak, mixed up with the lateral walls of the vagina, to approach the bladder supra-pubically, to separate it from above downwards, and then to freshen and stitch by the vagina the edges thus liberated.

to freshen them at the first over the whole circumference of the fistula, but only at a limited spot which is immediately stitched up.* A neighbouring portion is directly afterwards freshened and stitched up in the same way until the whole of the fistula has been closed.

If the case be extremely difficult, and will take a very long time, these partial operations may be performed on several occasions. The length of the operation is, in point of fact, very



Fig. 395.—Operation for vesico-vaginal fistula by "dédoublement" (Walcher).
a, fistula; b, vesical wall; c, vaginal wall.

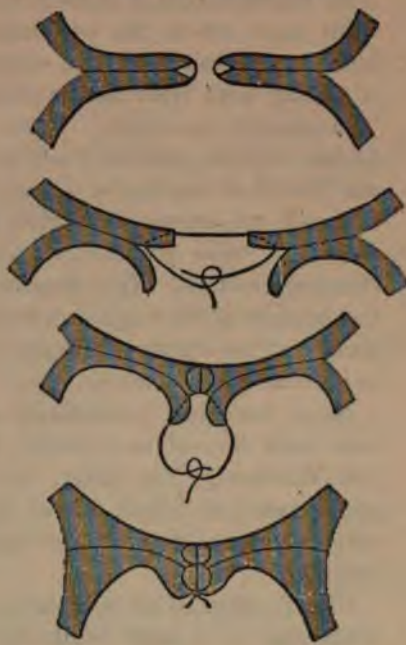


Fig. 396.—Operation for vesico-vaginal fistula by "dédoublement."
Diagrammatic sketch of the various stages (Walcher).

important, as much on account of the prolongation of the anæsthesia, which does no good to the patient, as for the fatigue it gives to the surgeon; it must distinctly be taken into consideration when the operation is a minute and delicate one.

If two fistulæ be very close together and separated by thickened tissue they should be thrown into one; but if the

* Courty. Gaz. des Hôp., May 26, 1877, p. 473.

bridge of mucous membrane be supple and fairly healthy, an endeavour should be made to preserve it.

When one has to deal with a narrow vagina, and has not sufficient tissue to freshen satisfactorily, advantage may be taken of the process of "dédoublement," which is the basis of Lawson Tait's operation of perineorrhaphy, and the first origin of which really springs from the operation for vesico-vaginal fistula.* I shall later on indicate the extent to which I am indebted to it in cases of uretero-vaginal fistula.

In cases where the perforation is very large and there is true loss of substance, the surgeon may be obliged to resort to taking flaps from the neighbouring tissues—to perform an "autoplastic operation." This procedure, which often confounds itself, in practice if not in theory, with "dédoublement," was first of all applied by Jobert, Gerdy, &c., to all cases alike; it found an ardent supporter at a relatively recent date in Duboué, † who proposed its constant combination with the American method. This surgeon used to cut two small flaps at the expense of the vaginal mucous membrane by separation of a portion of the septum, and united them by means of metal wires twisted over ivory buttons.

Since that time "autoplastic operations by dédoublement" have been revived in Germany by von Herff, Säger, Fritsch, and Walcher.‡ The latter, who has described its method of performance, at length unites the edges of the vesical orifice with catgut, and those of the vaginal wound with silk (figs. 395 and 396).

Closely allied to the autoplastic methods is that which secures obliteration of a large fistula by means of a plug formed from

* E. Blasius. *Handbuch der Akiurgie*, Halle, 1839, vol. 1, p. 460.—Many writers wrongly attribute the invention of the method by "dédoublement" to Maurice Collis (Dubl. Quarterly Journ. of Med. Sci., 1861, vol. 31, p. 302), the paper by whom was analysed by Azam in the *Bordeaux Medical Journal*, Aug. 1861, p. 356.—Lawson Tait (*Amer. Journ. of Obstet.*, Oct., 1889, p. 1044) declares that he was unaware of this work when he invented his method.—The first application of the method in Germany, after Blasius, was that of von Herff. *Zur Behandlung der Harnröhrenschleidenfisteln* (*Der Frauenarzt.*, 1887, p. 23).

† Duboué (Pau). On the use of a new autoplastic method, or one by flaps, in the operation for vesico-vaginal fistula (*Mém. de la Soc. de chir.*, 1864, vol. 6, p. 417).

‡ Von Herff (*loc. cit.*) first of all cured thus a urethro-vaginal fistula.—Säger. Einige geschichtliche und technische Bemerkungen zur Lappenperineorrhaphie (*Centr. f. Gyn.*, 1888, No. 47, p. 765).—Fritsch. Ueber plastische Operationen in der Scheide (*ibid.*, No. 49, p. 804).—G. Walcher. Die Auflösung der Narben als Methode der Plastik (*ibid.*, 1889, No. 1, p. 1).

the vesical mucous membrane, as was the practice of Lannelongue.* In a case in which the whole of the vesico-vaginal septum had been destroyed, and in which the posterior wall of the bladder projected into the fistula, he made use of the obturator thus presenting itself, and after having freshened the vesical mucous membrane at a point sufficiently distant from the posterior aspect of the perforation he attached it to the anterior lip, which he had previously freshened.

But autoplasmic operations are of the greatest service in cases



Fig. 397.—Operation for vesico-vaginal fistula. Sims' forceps and spatula.

of urethro-vaginal fistulæ with considerable loss of substance. Magnificent successes in cases of this kind have been reported by Houzel,† by Polaillon,‡ and by Fritsch.§

3rd Stage: suture.—For tightening the sutures Sims used

* Lannelongue. New method of treatment for vesico-vaginal fistula (Bull. Soc. de chir., March 5, 1873, 3rd series, vol. 2, pp. 106-111).

† Houzel (of Boulogne). Gaz. méd. de Paris, Jan. 14, 1888, p. 13.

‡ Polaillon. Communication to the Obstet. and Gyn. Soc. of Paris, May 9, 1889 (Arch. de tocol., 1889, p. 474).

§ Fritsch. Ueber Plastik der Weiblichen Harnröhre (Centr. f. Gyn., 1887, No. 30, p. 475). In cases of complete destruction of the urethra he has re-formed this canal by utilising two strips taken from the labia minora, the pedicle of which corresponded to the crura of the clitoris.

to use a pair of bent spring forceps which seized the two extremities of the wire, while the latter themselves were kept in the groove of a mounted spatula or "fulcrum" (fig. 397), which was pushed by the left hand along the wires until it came into

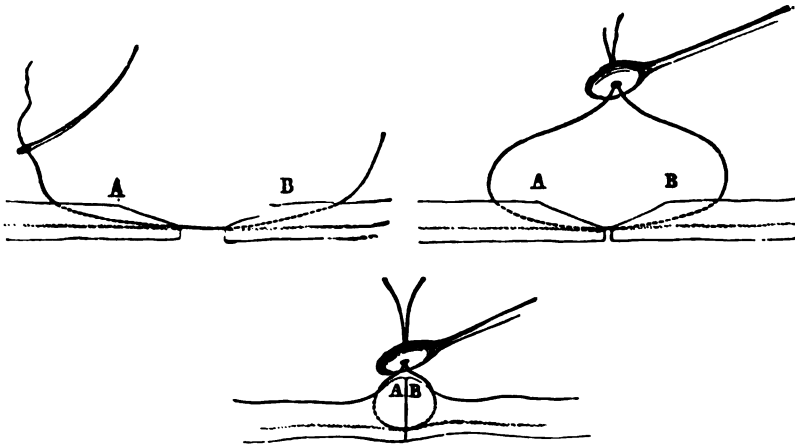


Fig. 898.—Operation for vesico-vaginal fistula. Bozeman's suture-adjuster.
A, B, freshened vaginal surfaces.

contact with the mucous membrane; the strands are then twisted by rotating the forceps on their long axis.

Before removing the fulcrum it is advisable to take hold of the wire with the forceps and to bend it in the vaginal axis so

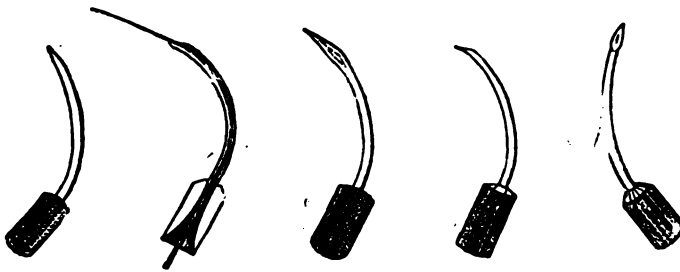


Fig. 899.—Neugebauer's needles.

as to avoid the possibility of its injuring the posterior vaginal wall. Sims places into the bladder his sigmoid sound, which maintains itself automatically in place.

Bozeman invented for the purpose of approximating the edges

of the wound a special instrument called a "suture-adjuster." It is a long steel rod with a small flattened disc at the extremity, which is pierced with a hole at its centre (fig. 398). Through the hole he passes the two ends of each thread, and while he draws on them with the left hand he glides the disc from side to side over the wound, so as to obtain exact apposition and to form the loop of wire into a ring, which it is then sufficient to fasten. Before the operation he has taken care to prepare two or three small plates of lead 1 mm. in thickness, cut as nearly as may be of the same size and shape as will be presented by the future apposed wound, and slightly concave in the centre so as not to press upon the lips of the wound. He pierces with a gimlet as many holes as there are stitches, passes through each hole the two ends of each loop, and pushes the plate until



Fig. 400.—Neugebauer's needle-carrier.

it comes into contact with the vaginal wall, on which he adjusts it with a small special hook. He then places on the wires rings of lead, which are pushed up to the plate and crushed together with pliers. He leaves a Sims' catheter in the bladder. For the operation, as for the purpose of taking out the stitches (on the tenth day or thereabouts), he places the patient in the genupectoral position.

Le Fort inserts two rows of stitches—one, deep, reaching as far as the internal circumference of the freshened surface or towards the deep edge of the wound, and terminating at some distance from the external edge of each lip. This layer of stitches is designed for the purpose of approximating the deep portion of the wound. They are fixed by means of Galli's tubes placed at the end of each thread. When the deep stitches have

been tied, the wound takes on a linear shape. The superficial portions are easily brought together by means of a second row of stitches introduced along the edges and twisted.

Neugebauer has invented a needle carrier, and a special kind of hollow needle provided with an octagonal eye, which allows of its being given any direction. With his operation-table,

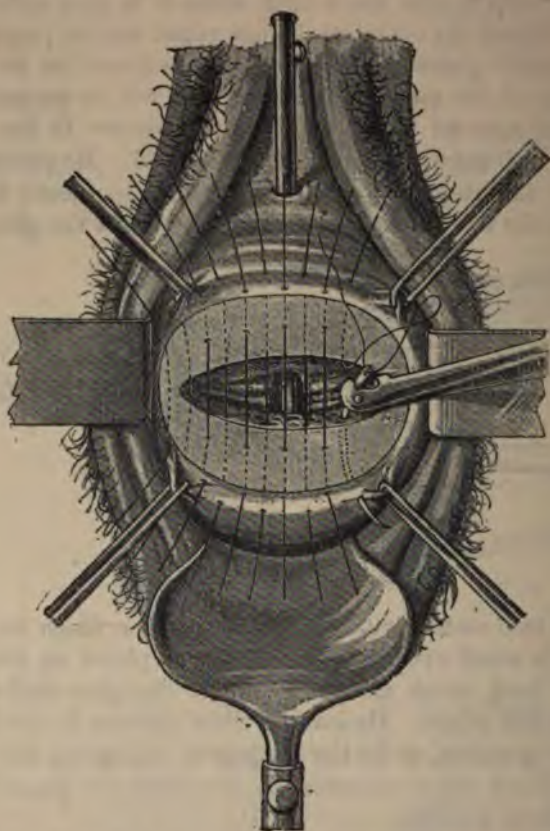


Fig. 401.—Occlusion of the vagina, or colpocleisis; freshening and suture.

his speculum, and his hooks provided with chains and weights, they compose a somewhat complicated though very ingenious armamentarium to which the Warsaw surgeon in large part used to attribute his remarkable success (figs. 399 and 400).

After-treatment.—The operation completed, the vagina is

washed out with a 1 in 2,000 solution of corrosive sublimate, and the line of union is powdered over with iodoform. A strip of iodoform gauze is placed in the vagina to protect the posterior wall from being wounded by the silver wire or the horse-hair, when either of these is preferred to silk; moreover, it absorbs the vaginal and uterine secretions. This simple dressing is sufficient, and need not be renewed until after the stitches have been taken out. Unless there be some special indication necessitating re-opening of the wound, the stitches should not be removed until after the eighth day, and then the greatest care should be taken not to drag on the wound.



Fig. 402.—Colpocleisis (diagrammatic section).

Sims recommended the use of a retention-catheter, and he invented for that object a sigmoid catheter, which keeps in position by the simple effect of its curvatures. I think it is of use in the first 48 hours. To its extremity should be adapted an india-rubber tube, dipping into a solution of boracic acid so as to evacuate the urine after the manner of a syphon, without allowing ingress of air. Prolonged use of this catheter would run the chance of inducing cystitis, and it is better after the first two days to rely upon catheterisation every 3 hours night and day. If there were at the time of operation any vesical catarrh which could not be cured, or if it supervene later,

each time the catheter is passed boracic solution should afterwards be injected, care being taken not to inject it at too great a pressure so as not to distend the bladder, the size of which is often greatly diminished. The catheterisation must be continued until two days after taking out the stitches, and consequently the patient must only be allowed to pass water on the tenth or twelfth day. From this time forward vaginal injections of corrosive sublimate should be given night and morning. If there remain a small crevice it should be touched with a pencil of nitrate of silver well drawn out to a point, and, as a rule, by this means spontaneous cicatrisation will be brought about. If the opening be larger, an attempt might be made to unite

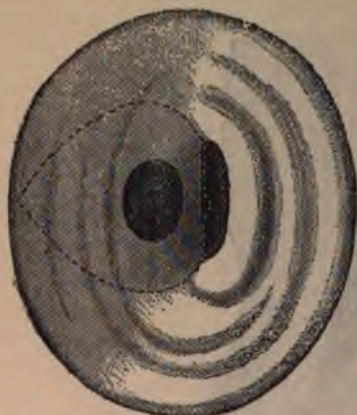


Fig. 403.—Juxta-cervical fistula ;
freshening.



Fig. 404.—Juxta-cervical fistula ;
suture.

the granulating edges with stitches so as to obtain secondary union. The retention-catheter should again be inserted into the bladder, or a catheter should be passed very frequently. A second operation of freshening should not be resorted to until at least a month after the first.

It is very important to keep the belly empty, but it is harmful to restrict a patient's diet. If the catamenia, as has often been known to occur, come on shortly after the operation, brought back by the influence of the traumatism, the gauze placed in the vagina should be renewed every day.

II. *Indirect obliteration of the fistula.*—There are certain conditions in which stitching of a vesico-vaginal fistula does

not offer the slightest chance of success; these conditions exist notably when the urethro-vaginal wall is extensively destroyed, the vagina filled with cicatricial tissue, and when the loss of substance has been very great, and the surrounding tissues have undergone great modifications. Adhesion of the fistula to the bony pelvis, complete destruction of the anterior lip of the cervix, which are very likely to lead to the wounding of the peritoneum during the process of freshening, are also conditions which may contra-indicate any attempt at direct obliteration. The surgeon must then resolve upon complete obliteration of



Fig. 405.—Superficial juxta-cervical fistula; freshening (diagrammatic).



Fig. 406.—Deep juxta-cervical fistula; vesical hysterocleisis (diagrammatic).

the generative canal. But for any attempt at obliteration of the vagina to be made without the risk of producing retention of menstrual fluid or hæmatometra, the communication between the bladder and the vagina must be of sufficient width, or, if necessary, it should be enlarged. Obliteration of the vagina, which is by far the preferable operation, and the one which I shall describe, has received the name of "colpocleisis"; obliteration of the vulva, which Vidal de Cassis had performed, and to which one might exceptionally be obliged to have recourse, takes the name of "episiorrhaphy," a name which is preferable to that of

“episiotensis” ; it is easy to apply to it the precepts which I am about to indicate for occlusion of the vagina.

It was Simon* who resuscitated the indirect operation and gave the directions for its performance.

1st Stage: freshening.—An endeavour should be made to obliterate the vagina as high up as possible, as this forms a much better guard against incontinence of urine than when the freshening is close to the urethra ; nevertheless it must be remembered that for success to follow the freshened surfaces must be very vascular, and if they cannot be found high up one may perforce be obliged to operate lower towards the vulva. Vidal de Cassis freshened the labia majora ; in such a case it is difficult to obtain complete union of the anterior portion. A ring of mucous membrane 2 cm. in width is to be dissected off, commencing from above and proceeding downwards, while the neighbouring parts are kept on the stretch by means of forceps ; dissection of the posterior wall will be greatly facilitated if an assistant place his finger in the rectum, and that of the anterior wall if it be drawn downwards by means of a catheter introduced into the bladder. The surface of the wound must be carefully trimmed with curved scissors.

Fritsch† has suggested that this freshening should be formed by “dédoublement” after a simple circular incision.

2nd Stage: suture.—The sutures should be of silk, and are to be inserted with large Hagedorn’s needles. They must be made to pass beneath the whole surface of the wound, first from below upwards, and then from above downwards. Great care must be taken not to penetrate into either the urethra, the rectum, or the peritoneum. As soon as the first thread has been inserted, it will greatly facilitate the rest of the operation by allowing the parts to be drawn into apposition. The stitches are to be tied with the greatest care, and riding up of the tissues must be avoided as much as possible. A few superficial stitches should be inserted (figs. 401 and 402).

To thoroughly appreciate the importance of this operation, we must not lose sight of the miserable condition of the women

* G. Simon. Historisches ueber den operativen Verschluss der Scheide durch Vereinigung der Scheidenwandungen (Kolpokleisis), &c. (Deut. Klin., 1868, No. 43, p. 405, and No. 46, p. 417).

† H. Fritsch, Centr. f. Gyn., 1888, No. 49, p. 204.

who are the subjects of it. Colpocleisis is often a valuable resource, although it also presents some disadvantages of various kinds. Impregnation is impossible, and coitus is only possible in the exceptional cases where obliteration can be carried out very high up. The menstrual blood sometimes leads to vesical catarrh, and the contact of the urine with the cervix leads to metritis. Pyelo-nephritis has occasionally, and the existence of vesical calculi has very frequently been noted.*

When the neck of the bladder is injured in such a way that there exists incontinence of urine, obliteration of the vagina alone is not sufficient to prevent a patient from being constantly wet. In these cases the idea has been conceived of removing the office of reservoir from the bladder to the rectum; for this object, at the same time that colpocleisis is performed, it is necessary to form a vagino-rectal fistula. Baker-Brown† seems to have been the first to have performed this latter operation on a patient who had a vesico-vaginal and a vagino-rectal fistula, with nearly complete obliteration of the vagina and destruction of the neck of the bladder and urethra. Maisonneuve‡ in 1851, of set purpose, formed a recto-vaginal fistula after obliterating the vulva, in the hope of seeing the sphincter ani retain the urine, which would then be passed per anum, but the fistula closed spontaneously, and a fresh attempt to establish a perineal fistula was followed by death.

Rose§ again took up this operation under the name of rectal obliteration of the vulva (*obliteratio vulvæ rectalis*). He begins by ensuring the permeability of an artificial recto-vaginal fistula a short distance above the anus by incising the recto-vaginal septum and apposing the mucous membranes with care. Cazin||

* L. A. Neugebauer. *Centr. f. Gyn.*, 1883, No. 9, p. 137. The calculus was removed and the vagina was again occluded.—W. Bergmann. *Ibid.*, 1888, No. 50, p. 824: case of phosphatic calculus. Death from uræmia caused by interstitial nephritis.—Baas. *Centr. f. Gyn.*, 1889, No. 21, p. 361: the phosphatic calculus, at first forming in the obliterated vagina, had afterwards passed into the bladder through the large fistula that had necessitated the colpocleisis. It was extracted after dilatation of the urethra.

† Cf. Malgaigne and Le Fort. *Manual of operat. med.*, 9th edit., 1889, 2nd part, p. 747.

‡ Cf. Malgaigne and Le Fort. *loc. cit.*

§ E. Rose. *Ueber den plastischen Ersatz der weiblichen Harnröhre* (*Dent. Zeitschr. f. Chir.*, 1878, vol. 9, p. 122).

|| H. Cazin. *Contrib. to the study of vesico-vaginal fistulæ; formation of a recto-vaginal fistula with occlusion of the vulva* (*Arch. gén. de méd.*, 1881, pp. 275 and 436).

and Schröder* have resorted to this operation, but it has not always proved innocuous. Serious symptoms have been known to supervene from passage of intestinal gases and fecal material into the vagina; moreover, the recto-vaginal fistula seems to have a great tendency to become obliterated. Nevertheless Fritsch† has seen two patients who had undergone such an operation and passed their urine by the anus without the slightest inconvenience; one of these women, who had been operated upon four years previously, was a laundress at his own hospital, and did not appear to be in the least incommode by the existence of this kind of cloaca.

Cervical fistulæ.—Urinary fistulæ implicating the cervix uteri are tangential to the infra-vaginal portion, which is more or less destroyed, and, so to speak, excavated by the process of sloughing from which the fistula has arisen. Since Jobert's time they have been allied to vesico-vaginal fistulæ under the name of vesico-utero-vaginal fistulæ, and are divided into two sub-varieties, superficial and deep, according as the destruction of the anterior lip of the cervix is partial or complete. This terminology is essentially defective. To my mind they ought rather to be approximated to fistulæ of the cervix of the uterus, and be spoken of as "juxta-cervical," reserving the name of "intra-cervical" for fistulæ that are also improperly called "vesico-uterine."

Juxta-cervical fistulæ which involve the cervix must not be confounded with fistulæ that are simply close to the cervix, but in which the latter is intact. In the latter case, one is sometimes obliged to incise the anterior lip for the purpose of freshening, or even forced to remove from it a V-shaped segment (fig. 393).

1. *Juxta-cervical fistulæ* (Syn. *vesico-utero-vaginal fistulæ*).—In the superficial variety obliteration may be obtained by means of thorough freshening; but special difficulties here will present themselves, for the anterior lip of the cervix, which limits the fistula behind, will of necessity be thinned and sclerosed. In front, freshening will have to be carried out of the upper

* Cf. Brüse. Sitzungber. der Berl. Gesell. f. Geb. u. Gyn., April 27, 1883 (Zeitschr. f. Geb. u. Gyn., 1884, vol. 10, p. 126).

† Fritsch. Ueber plastische Operationen in der Scheide (Centr. f. Gyn., 1888, No. 49, p. 804).

portion of the vesico-vaginal and even the urethro-vaginal septum. Toughness of the tissues constitutes a very serious obstacle; especially around the cervix the freshening must be very extensive, and the surgeon must have no hesitation in cutting away any portions of fibrous tissue that are incompatible with good union; it is far preferable to have to deal with an extensive raw but thoroughly viable surface, than with a more limited one, union of which would be doubtful (figs. 403, 404, and 405).



Fig. 407.—Deep juxta-cervical fistula. The posterior lip of the cervix and the posterior vaginal cul-de-sac are situated on the prolongation of the vesico-vaginal septum in consequence of the retroversion of the uterus.



Fig. 408.—Intra-cervical fistula; hystero-stomatocleisis (diagrammatic).

In deep juxta-cervical fistulæ the substance left may be quite insufficient for the purposes of freshening and obtaining approximation of the lips of the wound; it must be remembered also that freshening of the stump of the destroyed anterior lip is accompanied by considerable danger on account of the proximity of the vesico-uterine peritoneal cul-de-sac, which has been drawn down and fixed by the process of fibrous contraction. We are bound, therefore, to regard the cure established by Hegar* in a

* Hegar and Kaltenbach. *Loc. cit.* French trans., p. 507.

case of this kind by direct apposition as a happy exception and as a precedent that it would be difficult to follow.

Deep juxta-cervical fistulæ which do not lend themselves to direct suture, may also be operated upon in a different way. The posterior cervical lip has been stitched to the anterior or vaginal lip of the fistula. By this means the cervix uteri is made to open in the urinary reservoir (fig. 406). This operation might be called "vesical hystero-cleisis," to distinguish it from "hystero-stomato-cleisis," in which the lips of the cervix are stitched together (fig. 408). Care must be taken not to carry the process of freshening beyond the limits of the cervix on the neighbouring portion of the vagina so as to incarcerate it in the bladder. In point of fact, wounding of the peritoneum is then greatly to be feared. Almost the entire cervix may be hidden in the bladder, and the posterior vaginal cul-de-sac becoming prominent may simulate the posterior lip. Freshening at this spot would almost infallibly result in opening of the peritoneum (figs. 406 and 407).

2. *Intra-cervical fistulæ*.—According to A. Martin,* this variety of fistula is more common than is generally supposed, but they have a natural tendency to get well when they are not too extensive, and do not implicate the ureter. The first care of the surgeon is to bring the orifice into view by means of dilatation of the cervix with a laminaria tent. If the opening be small and the track of some length, cauterisation with the red-hot point of a thermo-cautery, or, better, a galvano-cautery may be tried, and repeated every week for a certain length of time. Various other cauterising agents have been tried, and amongst them nitrate of silver. Neugebauer† obtained by cauterisation 15 recoveries out of 133 cases, but he also had one death. If cauterisation fail, recourse may be had to one of the two following operations for the purpose of directly closing the fistula.

1. Freshening and suture.

2. Cystoplasty by dissection of the cervix on its anterior surface, and suture according to the method of Follet.

Freshening and suture were first successfully used by Jobert, of Lamballe (1849), in a case which long remained unique. Simon only performed the operation once. At the present day

* A. Martin. *Zeitschr. f. Geb. u. Gyn.*, 1879, vol. 4, p. 320.

† Neugebauer. *Arch. f. Gyn.*, 1889, vol. 85, part 3, p. 280.

several successful cases are known, viz., those of Emmet,* Kaltenbach, Lossen, Martin, Muller,† Schröder,‡ Neugebauer,§ Zweifel,|| and Säger.¶ The last-mentioned had recourse to a very ingenious method, which is really a trachelo-syngorrhaphy similar to Emmet's operation. In one case where the fistula was situated laterally he began by dividing the cervix on both sides, then on the side where the fistula was, he stitched up the cervix, as in Emmet's operation. In order to re-establish a satisfactory cervical orifice on the other side he stitched the mucous membrane of the interior of the cervix to that of the

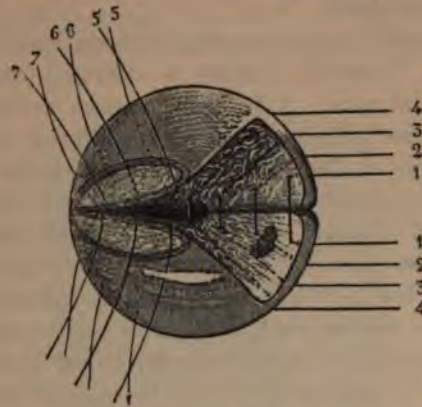


Fig. 409.—Operation for intra-cervical urinary fistula; Säger's method.

exterior, and thus formed an external os on the side of the cervix (fig. 409).

When the fistula is very high up and is situated in the middle line, it is very difficult to get at. Follet,** Wölfler,†† and Champneys‡‡ have then successfully performed cystoplasty and

* Emmet. The principles and practice of gynecology, London, 1880, p. 634 and foll.

† Hegar and Kaltenbach, *loc. cit.*, p. 524.

‡ Cf. Hofmeier. Manual of operat. gynecology. French trans., p. 106.

§ Neugebauer, *loc. cit.*

|| Zweifel. Obst. Soc. of Leipzig, Dec. 19, 1887 (*Centr. f. Gyn.*, 1888, p. 378).

¶ Säger. *Ibid.*, p. 377.

** Follet (of Lille). Vesico-uterine fistula; new method of cystoplasty (*Bull. et Mém. de la Soc. de chir.*, May 26, 1886, p. 445).

†† Wölfler. Oest. ärzt. Verein-Zeit., 1887 (*Memorabilien von Fr. Betz.* Heilbronn, 1887, part 2, p. 99).

‡‡ Champneys. Obst. Soc., London, Oct. 3, 1888 (*anal. in Annal. de Gyn.*, Nov., 1888, vol. 30, p. 376).

immediate suture of the vesical perforation, which was previously brought into sight. The following is the way in which Follet proceeded: he first dilated the urethra so as to admit the finger. He then lowered the cervix down to the vulva, incised the anterior vaginal cul-de-sac, and detached the bladder to a little way above the perforation. Lastly, he stitched up the latter with the assistance of the finger in the urethra. This bold procedure, inspired by Jobert's "cystoplasty by locomotion," no doubt presents some danger of wounding the peritoneum; but with good antiseptic arrangements this accident need not be regarded as formidable.

Otto von Herff* makes a median incision into the cervix up to the fistula. Then the bladder is separated from the uterus for about a centimetre. A freshened surface results therefrom, which is composed of two halves—one posterior and the other anterior. Each of them comprises in its midst one of the openings of the separated fistulous track. This freshened surface is then stitched up as if it were an anterior elytrorrhaphy. In cases where the suture would come to the vaginal orifice, a vesico-vaginal fistula would be present, and should be treated by one of the known methods. As a last resource we have hysterocleisis, which it would be better to call hysterostomatocleisis—that is to say, suture of the two lips of the cervix (fig. 408). The catamenia then pass into the bladder, and if the orifice be very small, may be accompanied by considerable pain. Courty has, however, seen menstruation in this way carried on without the slightest inconvenience in several cases. One must, of course, warn the women that the operation causes sterility; nevertheless impregnation may occur even when there is only a small orifice sufficient for the passage of a probe, as in a case seen by P. Deroubaix.

Uretero-vaginal and uretero-cervical fistulæ.—For a very long time direct obliteration of these fistulæ was regarded as beyond the powers of surgery. But at the present day several operations are known applicable to uretero-vaginal fistula.

Method of direct obliteration.—Simon's method.† A vesico-vaginal fistula is first of all formed beside the orifice of the

* Otto von Herff. Zur Behandlung der Blasengebärmutterfisteln (Zeitschr. f. Geb. u. Gyn., 1891, vol. 22, p. 1).

† Simon. Wien. med. Woch., 1876, No. 28, p. 692.

ureteral fistula; a catheter is passed into the ureter by this way; then always across this window the ureter is separated above in such a way as to convert that portion of the duct which is enclosed in the walls of the bladder into a gutter of one or one and a half centimetres in length. The edges of this incision should be opened up every day with a channelled sound, so as to prevent their agglutination, and to make sure that they cicatrise separately. When the surgeon imagines that this object has been attained he closes by free freshening and transverse stitching the artificial vesico-vaginal fistula, which is now at some distance from the opening of the ureter into the bladder.

Landau's method.—Landau* has suggested the preliminary

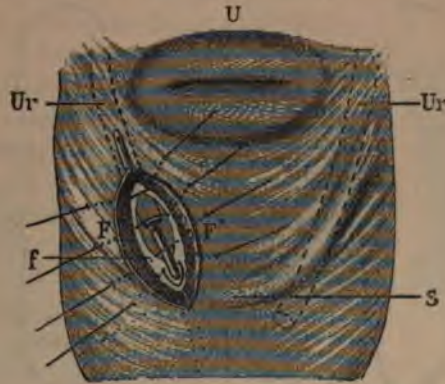


Fig. 410.—Operation for uretero-vaginal fistula; Landau's method.

U, cervix; *Ur*, track of ureter; *S*, fold of vagina corresponding to the inter-ureteric ligament; *FF*', vesico-vaginal window, at the bottom of which is seen the sound introduced into the ureter.

formation, if there be no large vesico-vaginal perforation which would render it unnecessary, of a vesico-vaginal window by excision of an oval strip; then he passes into the ureter a fine elastic catheter, which he carries into the bladder and brings out into the urethra. The patient is then placed in the genu-pectoral position, and the vaginal mucous membrane is freshened all around the gap in the ureter, the calibre of which is ensured by the presence of the catheter. Stitches perpendicular to the catheter are then inserted; the catheter is left *in situ* for several

* Landau. Arch. f. Gyn., 1876, vol. 9, p. 426.

days (fig. 410). Bandl* adopted this method and put it into practice, with slight modification, in two cases; he obtained a cure after several attempts, but not without having been obliged to undo the stitches on one occasion when they had included the ureter.

Schede's method.—Schede† formed a vesico-vaginal fenestrum by excision of a portion of the bladder, two square centimetres in extent, in the direction of the track of the ureter. The ureteral fistula was hidden beneath a fold of mucous membrane, and situated at the bottom of a pit of scar-tissue on the sides of an old laceration of the cervix. Care was taken to stitch the vesical and vaginal mucous membranes over the lips of the

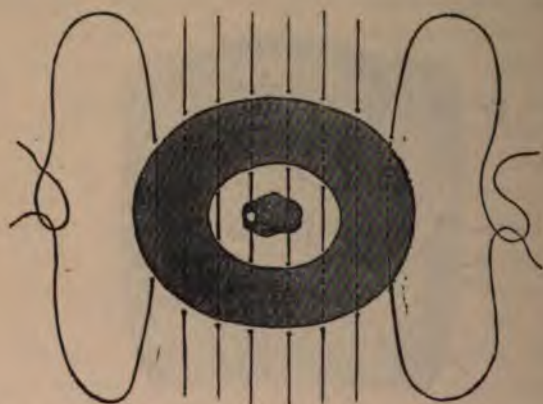


Fig. 411.—Operation for uretero-vaginal fistula; Schede's method (diagrammatic).

excised portions so as to draw on the opening and prevent it from contracting; an elastic catheter was introduced into the ureter through the artificial fenestrum, the other extremity of the catheter was introduced into the bladder and then drawn out through the urethra. After this a ring of mucous membrane was removed from around the fistula, preserving intact at the same time a zone of mucous membrane, 3 to 4 mm in diameter, immediately around the orifice. In this way the edges of the fistula, covered by intact mucous membrane, were, after stitching, returned into the bladder, and formed in it a gutter, at the

* L. Bandl. Zur Entstehung und Behandlung der Harnleiterscheidenfisteln (Wien. med. Woch., 1877, No. 30, p. 721, and No. 32, p. 749).

† M. Schede. Centr. f. Gyn., 1881, No. 23, p. 547.

extremity of which the ureter opened (fig. 411); recovery after a series of accidents.

It was to an analogous method of freshening that Professor Trélat* twice had recourse, though he did not catheterise the ureter. In point of fact it does not appear to me that the preliminary stage of the formation of a vesical fenestrum and introduction of a catheter into the ureter is here absolutely indispensable, as in Landau's method.

Method of "dédoublement."—In a case of uretero-vesico-vaginal fistula (the patient had been operated upon eleven times by the ordinary method), I was able to confirm the diagnosis by introducing Pawlik's ureteric sound to a depth of 21 cm.; the vesico-uretero-vaginal orifice was small, and would only admit an ordinary uterine sound. I adopted the process of "dédoublement" inaugurated by Gerdy, and applied by Blasius, Duboué, Collis, von Herff, Walcher, &c., to ordinary vesico-vaginal fistulæ. I believe that it here finds a quite special indication by permitting the return of the orifice of the ureter into the bladder without fear of including it in the sutures. This is how I proceeded.† The patient being in the genu-pectoral position, a transverse incision was made at the level of the fistula, extending beyond it on each side for about 1 centimetre. A vertical incision



Fig. 412. — Operation for uretero-vaginal fistula; Pozzi's method (diagrammatic).

at each extremity gave it the shape of an H (\equiv on its side). Dissection of the edges of the transverse incision for the extent of 1 cm. produced two small flaps, each half the thickness of the septum. This is the part of the operation which constitutes "dédoublement." When these flaps were raised, the small

* Trélat. Bull. et Mém. Soc. de chir., Feb. 23, 1887, p. 117.—Despres (Bull. et Mém. Soc. de chir., 1888, p. 668) has described under the name of "Suture at a distance" the freshening that I have just described as Schede's method; he has applied it successfully to the cure of fistulæ of the trachea, the urethra, and to vesico-vaginal fistula (without implication of the ureter).

† S. Pozzi. Uretero-vesico-vaginal fistula cured by colpoplasty (Bull. et Mém. Soc. de chir., Feb. 23, 1887, vol. 13, p. 114).

orifice of the fistula was seen in the centre of the raw surface. The two flaps were drawn towards one another in front of the orifice, and apposed without the least difficulty. They were carefully joined together by three deep silver stitches and three superficial stitches. After suture and apposition of their internal surfaces they formed over the previous region of the fistula a small projecting crest. The stitches were removed on the eighth day. The cure was complete. This method has the advantage of being extremely simple. In cases in which the vesical fistula is larger and the "dédoublement" more important, the flaps should be brought into apposition by means of buttons on which split shot should be crushed after being placed on the extremities of each of the sutures (fig. 412).

Herrgott, of Nancy,* however, without following it in every detail, has successfully adopted the principle of this method by dissecting and turning towards the bladder, for the extent of a centimetre, the ureter, which opened on the edge of the fistula and into which a small bougie could be passed. When in the case of a large uretero-vaginal fistula the surgeon is lucky enough to thus make certain of the exact position of the ureter, he may in point of fact content himself with performing a partial "dédoublement" on the only lip on which it is indispensable. But it will often happen, as in my own case, that at the very moment of operation this orifice will no longer be able to be found, and then it will be preferable to perform the complete operation.†

2. *Method of indirect obliteration.*—This method, which one is forced to apply to uretero-vaginal fistulæ when direct freshening has failed, is the only one applicable to uretero-cervical (or uretero-uterine) fistulæ. It consists either in obliterating the genital canal below the fistula, or in removing the kidney on the side on which is situated the perforation of its excretory duct. The first plan would be reduced to its least disadvantageous

* Hergott (of Nancy). A case of vesico-uretero-vaginal fistula with sloughing of a portion of the left ureter; operation, recovery (Ann. de Gyn., June, 1888, vol. 29, p. 408). This case was communicated to the Academy of Medicine, May 22, 1888.

† Parvin (Western Journ. of Med., Oct., 1887) obtained some successful cases by a procedure which has nothing methodical about it, and apparently as the result of a lucky chance. He first of all formed a large vesico-vaginal fistula, then some days after, by freshening a very large surface of the vagina, he was able to turn it back in such a way as to leave the opening of the ureter inside the bladder.

form if hystero-stomato-cleisis or obliteration of the infra-vaginal cervix were possible; but that this occlusion may be devoid of danger it is necessary for the fistula in the ureter to be lateral and not terminal. Now, on the other hand, it is well known that the end of the duct between the bladder and the fistula contracts and has a tendency to become obliterated.* Theoretically one could then endeavour to form an artificial vesico-cervical fistula, which would allow of the evacuation of the urine which would accumulate in the uterus; or again, one could attempt to form an artificial ureter, a kind of canal at the side of the obliterated natural duct. Both of these plans have been attempted by Zweifel, but without success. Hystero-cleisis must, therefore, be put on one side, and the surgeon must decide on obliteration of the vagina, or "colpo-cleisis," after preliminary establishment of an artificial communication between this organ and the bladder. This plan was first of all carried out by Hahn.† He took care to limit the upper edge of this opening by apposing the mucous membranes and by suturing the lower lip to the posterior vaginal wall, so as to ensure the patency of the vesico-vaginal communication. But the husband later demanded the re-opening of the vagina and the artificial vesico-vaginal fistula persisted, while cure of the ureteral fistula occurred spontaneously. Kehrer‡ has published an interesting case: he remarks, very justly, that an incision is not sufficient to ensure a communication between the bladder and the vagina; it is necessary to excise a disc of about 2 cm. in diameter from the vesico-vaginal septum, and to sew its edges over carefully.

It is only with the greatest reluctance that women consent to undergo obliteration of the vagina, and it has often happened that after consenting they have asked to be returned to their former condition of infirmity. One can, therefore, understand that nephrectomy has been performed, in spite of the danger

* A case of Duclout's certainly exists (*Gaz. méd. de Paris*, 1869, p. 43), in which hystero-cleisis was successfully performed after evidence had been obtained, by obliteration of the cervical canal with laminaria, that no symptoms of uremia were being produced, and that consequently the ureter still communicated with the bladder. But the diagnosis seems doubtful and possibly it was only a case of vesico-cervical fistula.

† E. Hahn. *Berl. klin. Woch.*, 1879, No. 27, p. 397.

‡ Kehrer. *Cent. f. Gyn.*, 1889, No. 32, p. 565.—The uretero-vaginal fistula in this case was secondary to an operation performed on the cervix for the removal of a fibroid.

there is in depriving of one of her kidneys a woman who may be affected with a certain degree of unrecognised bilateral ascending nephritis. The first conception of this operation dates from Simon. Zweifel,* in 1878, and then Crédé,† were amongst the first to perform it; and in 1889 at least eleven cases were known, including that of Treub.‡ It is extremely important, before resolving upon nephrectomy, to make certain of the condition of the only kidney which will be left to the patient. The urine should, therefore, be most carefully examined, chemically and microscopically. It would be preferable to obtain the urine for this examination directly from the ureter that is supposed to be healthy, by means of catheterisation.

Statistics of the operation. Accidents during operation. Results.—I shall only bear in mind, in what follows, the direct operation for ordinary vesico-vaginal and urethro-vaginal fistulæ. They must be regarded as absolutely benign; it only becomes a slightly more serious matter if the fistula is close to the cervix, and consequently near to the large uterine vessels, the ureters and the peritoneum.

Verneuil§ has published an account of the cases in his practice that have been followed by death; they were five in number, out of eighty operations. But it is only fair to remark that the greater number of them are of pre-antiseptic date;|| this proportion would be at the present time far too high. Hegar and Kalténbach have not lost a single patient out of a series of over eighty cases.

Laceration of the posterior vaginal wall from the pressure of a retractor handled with extreme force need only be mentioned because Courty has seen such a case;¶ it is intelligible that peritonitis might result therefrom.

* Zweifel. Ein Fall von Ureteren-uterus-fistel geheilt durch die Exstirpation einer Niere (Arch. f. Gyn., 1878, vol. 15, p. 1).

† B. Crédé. Nephrectomie wegen Ureteren-uterus-fistel (Ibid., 1881, vol. 17, p. 312).—Jules Boeckel. Bull. et Mém. Soc. de chir., June, 1884, p. 448.—Fritsch, cited by Heilbrunn. Centr. f. Gyn., 1886, No. 1, p. 1.

‡ A. H. van der Weerd (Assistant to Prof. Treub, of Leyden). Over fistula uretero-uterina. (Nederl. Tijdsch. v. Verloek. en Gyn., Haarlem, 1889, p. 161.) Cf. also for the bibliography and the history of a case, C. D. Josephson (of Stockholm), Hygiea, 1887, vol. 49, No. 5, p. 279, and No. 6, p. 343.

§ A. Verneuil. On the mortality of vesico-vaginal fistula (Ann. de Gyn., Jan., 1877, vol. 7, p. 1).

|| Jobert, of Lamballe, had observed 26 deaths in 147 cases.

¶ Courty. Pract. treatise on Dis. of the uterus, 3rd ed., 1881, p. 1406.

Fatal primary hæmorrhage has only supervened under particularly unfavourable circumstances, such as when the patient was the subject of hæmophilia, for example; Horteloup* has noted one case which was due to wounding of a very large uterine artery. This case is quite exceptional; nevertheless one may be extremely inconvenienced during the operation by the flow of blood, if one freshen the lateral walls of the vagina where the veins are very large, if one operate too close to the time at which the sloughs separate, and lastly, if one wound the vesical mucous membrane. Direct compression first, and suture afterwards, are the best means for overcoming it. But one then finds oneself in the midst of very unfavourable circumstances for the success of union by first intention.

Secondary hæmorrhage has been observed from the third to the fifth day; then I think the surgeon has always made some mistake during the operation. The best remedy is plugging. If the hæmorrhage occur into the bladder he may not be warned of it quite at first, and this cavity would be distended with clot before any remedy could be applied. The clots are passed in fragments by the urethra, and their expulsion is accompanied by extremely painful tenesmus; decomposition of that which is not evacuated infallibly leads to failure of the plastic operation. Their expulsion must be facilitated by the frequent use of vesical injections. If the bladder-distension be great, the surgeon should not hesitate to dilate the urethra and extract the clot, breaking it up with a blunt curette. Lastly, if the hæmorrhage continue, the stitches must be cut, and the surgeon must go in search of the bleeding vessel from the vaginal side. Wounding, and particularly ligature of the ureter are indicated by the onset of lumbar pain, vomiting, and fever. No time should be lost in removing the suspected threads, as this complication may become serious; in point of fact the stitch ends by ulcerating through the distended ureter, which spontaneously brings about a tardy cessation of the symptoms of commencing uræmia.

Infective complications, phlebitis, pyæmia, lymphangitis, diphtheria, were already very rare in olden times, and at the present day are quite exceptional. Peritonitis may result from an injury to the peritoneum by the freshening or the sutures, if

* Horteloup. Bull. Soc. de chir., May 5, 1869, p. 198.

antiseptic precautions during the operation have not been thoroughly carried out, or again, if concomitant cystitis or pyelitis lead to infection of the wound.

The formation at a later date of calculi or of calculous incrustations has been noticed in the bladder; these are formed upon silver or silk ligatures which have cut through the tissues and fallen into the bladder. It must never be forgotten that almost all patients who are the subjects of fistulæ have their urine altered in composition by the symptomatic inflammation of the bladder, which has become propagated to the pelves of the kidneys, and even to the renal substance itself. Under these conditions the formation of calculi is greatly favoured, but since they are always phosphatic and very friable, they can be easily broken down and evacuated by lithotrity.

The results yielded at the present day by the surgical treatment of fistulæ are remarkably satisfactory. It may be said that there is scarcely a case that may not be cured by either direct or indirect operation; it is true that the latter substitutes a deformity for an infirmity, or may necessitate the serious sacrifice of one of the kidneys. Many failures are due to an incomplete diagnosis. As I have said above, I have operated upon a woman in whom eleven attempts had previously been made to obliterate a small fistula in the anterior vaginal cul-de-sac but without success. I convinced myself that this lack of success arose from the fact that the ureter opened into the fistula, and I put into practice the method of freshening by "dédoublement," which returned the opening of the ureter into the bladder and brought about an immediate cure. Incontinence of urine often persists long after the fistula has been closed, inasmuch that the patient who continues to pass her water involuntarily cannot believe that she is cured. Various anatomical conditions may be the cause of this incontinence: loss of tonicity from the effect of disuse of the sphincter vesicæ and of the muscular fibres of the urethra, which in women play a very important part in the normal retention of the urine, is quite a sufficient explanation.

Various kinds of medical treatment have been adopted for this infirmity; injections of strychnine, hot-water douches, electricity, &c. Schatz resorted to the use of a special kind of pessary; all kinds of pessaries, and in particular that of Dumont-

pallier, may, by compressing the urethra, at any rate lessen the incontinence. Undoubted success has sometimes followed a small plastic operation, the object of which is to diminish the calibre of the urethra; the urine in consequence meets with a

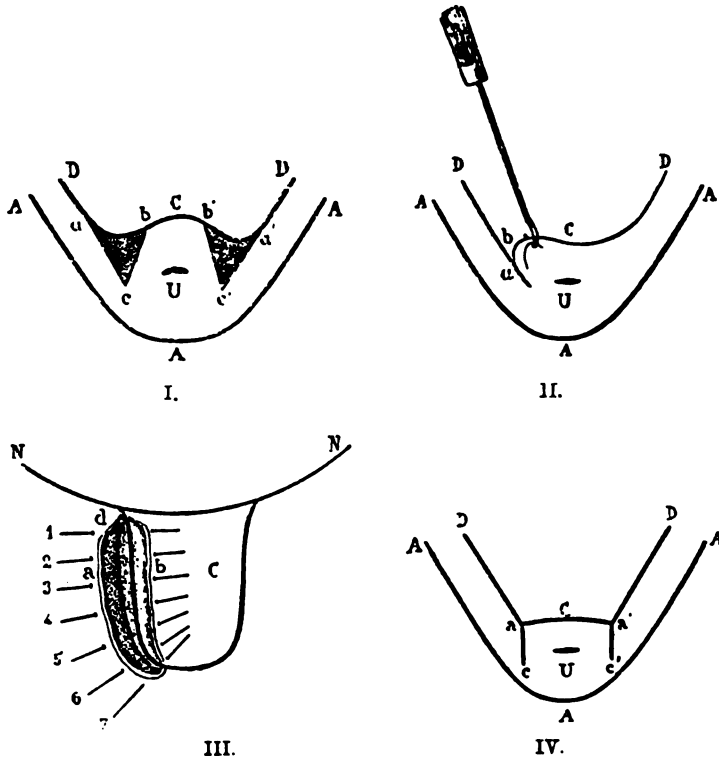


Fig. 413.—Pawlik's operation for incontinence of urine.

- I. Region of the urethra seen when the patient is in the genupectoral position. II. Estimation of the extent of freshening by traction with a hook. III. Freshening. IV. Operation completed.

A, line of pubic arch; C, prominence formed by the urethral canal; D, depression behind the pubis; U, meatus urinarius; a, b, c, a', b', c', dimensions of the juxta-urethral areas of freshening.

certain amount of obstruction, and can only escape when it has accumulated in a sufficiently large quantity to overcome it. Schröder,* with the object of elongating and altering the position

* Cf. R. Mörcke. Zeitschr. f. Geb. u. Gyn., 1880, vol. 5, p. 824.

of the urethra, freshened the tissues on the two sides. Pawlik* has removed, laterally, wedge-shaped portions of tissue so as to draw on the urethra transversely, and to bend it in such a way as effectually to combat the patency of the canal. The following is his mode of procedure: he begins by drawing the urethral canal with a hook as far to the side as possible and marks the points that correspond to this displacement (fig. 413). He obtains the limits of his areas for freshening, and proceeds to make two parallel incisions from above below, starting from the above-mentioned points. Below, these incisions are inclined to one another in such a way as to allow the urethra to be bent. The urethral orifice is then drawn with a hook away from the clitoris, and the extreme point to which it can be drawn is marked; the incision is continued to this point, care being taken to give it a slightly concave direction on its inner side, in such a way that after stitching the external urethral orifice shall not find itself too strongly compressed. When this outline is complete the tissues are freshened, while at the same time the tissues on the sides of the urethra are hollowed out; from this there results a fairly deep wound. The wound is stitched up while the urethra is drawn towards the clitoris; the stitches become more and more obliquely placed in proportion as the orifice of the urethra is approached, and the last of them are even inserted directly from before backwards. Pawlik operates with the patient in the genupectoral position; he uses carbolised silk, and powders over the stitches with iodoform. He waits a week before operating on the other side, by which time the patient has recovered from the first interference, and recommends in the early days following the operation frequent emptying of the bladder. He has thus obtained several successful cases.

FÆCAL FISTULÆ.

I shall include under this common title recto-vaginal and entero-vaginal fistulæ.

* Pawlik. Beiträge zur Chir. der weibl. Harnröhre (Wien. med. Woch., 1888, No. 25, p. 769, and No. 26, p. 808).

RECTO-VAGINAL FISTULÆ.

Ætiology.—The most common cause is parturition; but it is not compression which here is the active cause, as is the case with urinary fistulæ, by the formation of sloughs. Recto-vaginal fistulæ are a more immediate consequence of the injury, and as a rule follow upon a large laceration of the perinæum, which has cicatrised below at a point where the tissues are thicker, but has remained open above, where they are thinner; the thinness of the recto-vaginal septum at this point has allowed the two epithelia to become joined, and in this way to permanently form a means of communication. Other causes may also, but more rarely, come into operation: laceration by the forceps or the cephalotribe, gangrene of the septum by impaction of the head, direct injury by a foreign body forcibly introduced or remaining for a sufficient length of time to lead to ulceration, whether this foreign body act through the vagina or the rectum. Lastly, ulceration of various natures, abscesses of one or other of the canals may lead to the formation of an abnormal communication between them; these perforations are sometimes formed above strictures of the rectum.* Dermoid cysts, cysts of extra-uterine gestation situated in Douglas' pouch, which have suppurated, may lead to a communication between the vagina and the rectum by opening into both of them at the same time. But these fistulous openings do not enter, before cicatrisation of their edges, into the category of fistulæ properly so-called.

Pathological anatomy.—I shall only consider what may be called cicatricial fistulæ, and shall leave on one side recent abnormal communications, true fresh wounds, cancerous fistulæ, which are only an epi-phenomenon in a pathological process, and purulent fistulæ in way of evolution.

It is necessary to establish with Verneuil a division from the point of view of their seat. There are fistulæ which must be called "recto-vulvar," because they open on the edge of the vulva quite close to the fourchette; others are "inferior recto-vaginal," their orifice being in the lower half of the vagina;

* Févriér. Fistule with stricture of the rectum. Thesis, Paris, 1877.

others again, less uncommon, are "superior recto-vaginal," and may be situated in the neighbourhood of the cervix in the posterior cul-de-sac; they are generally secondary to a former evacuation of some collection of fluid in Douglas' pouch. Their size is variable; recto-vulvar fistulæ are usually reduced to a small chink; fistulæ of the lower portion of the vagina are generally also very small. Sometimes the septum is so thin that they appear as if they had been made by an "emporte-pièce," and are clearly "ostial" or "labiform"; sometimes on the other hand, they are canalicular, presenting an oblique track in the thickness of the wall, and their vaginal orifice is then sometimes covered by a kind of operculum formed by the more or less damaged and incised posterior column of the vagina. Fistulæ situated in the posterior vaginal cul-de-sac may be of somewhat large size, for they are sometimes secondary to a large slough caused by the pressure of a tumour before emptying itself into one or other of the two neighbouring canals. I have seen a fistula of this kind which would admit the thumb; it came from the evacuation of a foetal cyst.

When the fistula presents a definite track, it is the vaginal mucous membrane which seems to be drawn in and to line it.

The edges of these orifices are as a rule hard, callous, and well-defined; cicatricial tissue may by forming bridges that partition off the vagina connect them with vesico-vaginal fistulæ due to the same laborious parturition.

Symptoms and diagnosis.—The passage of flatus and of faecal matter is at the same time the pathognomonic symptom for the practitioner, and the most galling phenomenon for the patient. The passage of faecal matter is not absolutely constant, and is wanting when the fistula is narrow or oblique, and the faeces are solid; but this symptom appears with diarrhoea. A somewhat intense vaginitis supervenes if this phenomenon be habitual. The surgeon can feel with the finger a slightly prominent orifice, and the speculum, aided by the sound and by rectal examination, always allows of its being discovered. For this examination the patient should be placed in Sims' position, which is the most convenient for the purpose. If necessary an enema of milk should be given, which would percolate through a crevice that might be hidden behind some fold or scar in the mucous membrane.

Prognosis.—However unimportant it may appear to be, we have here a singularly obstinate affection, for the difficulty of cure is by no means proportionate to the extent of the lesion. The most difficult cases are those in which there are multiple cicatrices in the vagina. Cases have been reported of spontaneous recovery; but this is simply an erroneous denomination, for these so-called "fistulæ" were really only granulating wounds. A perforation, the edges of which have become cicatrised, cannot possibly be cured naturally, or, to speak in exact terms, is itself a defective but definitive attempt at spontaneous cure.

Treatment.—At the first glance it seems as if direct suture of the fistula by the vagina would be the most simple operation. Such, however, is not the case. In point of fact, in this way only a moderate extent of raw surface can be obtained, and success is much less probable than by the indirect method, which consists in including the perforation in a large freshened surface that implicates the perinæum. We may therefore say that in the vast majority of cases the operation for recto-vaginal fistula consists in a slightly modified colpo-perineorrhaphy, and that the operation of election is that including the perinæum, and that the vaginal operation is the exception.

Operation by the perinæum.—The older surgeons used to confine themselves to making a vertical incision in the perinæum up to the fistula, entrusting the care of cicatrisation to nature, but reserving the power of modifying it afterwards by a complementary operation.* Later, section of the perinæum was only made the first step of an immediate perineorrhaphy; in a word, that resolved itself into transforming the recto-vaginal fistula into a complete perineal rupture and treating it as such. Isolated cases of this practice are due to Ricord,† Demarquay,‡ Baker-Brown.§ Richet|| was the first in France, and Simon¶ in

* Saucerotte. *Mélanges de chir.*, Paris, 1801, p. 530.

† Cf. L. M. Michon. *Operations necessitated by vaginal fistulæ*. Thesis, Paris, 1841, p. 224.

‡ Demarquay. *Ann. de Gyn.*, 1875, vol. 3, p. 851.

§ Baker-Brown. *Lancet*, March 26, 1864, vol. 1, p. 347.

|| Richet. *Ann. de Gyn.*, 1876, vol. 5, p. 491. Richet's ideas had been developed as long ago as 1867 by one of his pupils, L. Serres, on recto-vaginal fistulæ considered from the point of view of treatment. Thesis, Paris, 1867.—Richet's first operation was in 1859.

¶ G. Simon. *Operationen der Urinfisteln des Weibes* (Prag. Vierteljahr. f. prakt. Heilk., 1867, vol. 94, p. 61).

Germany, to make a regular operation of it. Since then it has found many supporters.* Recently the generalisation of the method of "dédoublement," with which Lawson Tait has had so much to do, has come to extend the field of perineorrhaphy still further. This method presents, in point of fact, the great advantage of yielding, with but little expense of tissue, an enormous surface for apposition, and of permitting movement of the rectum; the latter destroys the parallelism between the rectal and vaginal orifices of the fistula, which are made to slide one over another after the manner of action of a slide-valve.

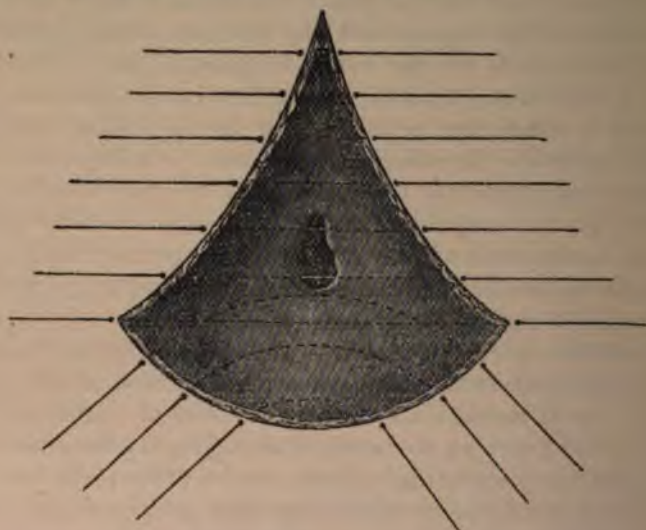


Fig. 414.—Hegar's operation of colpo-perineorrhaphy applied to the treatment of recto-vaginal fistula.

Before this method of perineorrhaphy came into general use the whole series of operations which will later be described (see Ruptures of the Perinæum) had been put into use. Thus Schauta† employed Hegar's method of triangular freshening, taking care to include the fistula within its limits, and to unite

* F. Rizzoli. *Bull. des sciences méd. de Bologne*, 1867, vol. 4, p. 226.—Labbé, *Le Dentu. Bull. et mém. Soc. chir.*, 1882, pp. 350 and 352.—Ch. Monod. *Ann. des mal. des org. génito-urin.*, 1882, pp. 46 and 132.

† Schauta. *Ueber die Operation von Mastdarmfisteln* (*Verhandl. der deutsch. Gesellsch. f. Gyn. zu München*, 1886, p. 282).

its edges by hidden catgut sutures. Chrobak* has also had reason to congratulate himself on having adopted this course. But I repeat once more, the operation of election at the present day seems to be that of Lawson Tait, which is applicable to almost all cases.

Attempts have been made to formulate the indications for operation, either according to the higher or lower seat of the recto-vaginal fistula, or according to the greater or less degree to which the perinæum is preserved. These indications are no doubt useful, but they will especially be of value in estimating

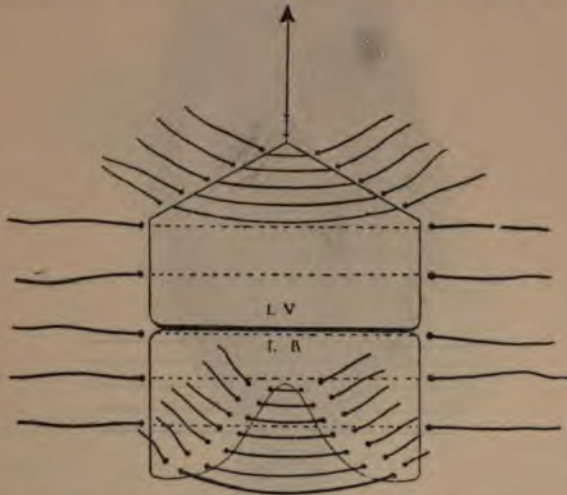


Fig. 415.—Rectal, vaginal, and perineal stitches after vertical section and "dédoublement" of the perinæum (diagrammatic).

L, R, rectal flap with Lauenstein's suture; *L, V*, vaginal flap.

the degree to which the separation of the tissues must be carried. They will also be of use in determining whether it is necessary, before making the vertical incision, to form a small bridge of skin which alone could separate the fistula from the perinæum or to divide a flaccid and non-muscular perinæum, even when it is of a certain thickness. We may after this preliminary consideration form two varieties of the operation of perineorrhaphy.

* R. Chrobak. Ueber Mastdarmscheidenfisteln (Wien. med. Blätter, 1887, pp. 841 and 877).

A. If the perinæum be too thin, or simply does not appear to be of sufficiently ample proportions to be respected, no hesitation should be felt in dividing it right up to the fistula, and then immediately perineorrhaphy should be proceeded with according to the rules laid down by Lawson Tait for complete rupture of the perinæum.

It is then advisable I think to follow Säger's example,* and



Fig. 416.—Sutures after vertical section of the perinæum and its "dédoulement." The rectal flap is stitched up. The vaginal and perineal threads have not yet been tied (Säger).

when the cleft extends very high (figs. 416 and 417) to stitch the rectum separately with silk stitches, inserted after the method called by Lauenstein's name,† but which this surgeon

* M. Säger. The operative treatment of recto-vaginal fistula (Buffalo Med. and Surg. Journ., June, 1891).

† Lauenstein. Centr. f. Gyn., 1886, p. 9.

borrowed from Lambert's method of obtaining apposition of serous membranes.

Nevertheless this separate suture of the rectum only appears to me to be advisable when the recto-vaginal septum has been divided to a considerable height; in cases where the division of the rectum is not very extensive it will be sufficient to loosen it from its attachments by "dédoublement"; one can almost always thus draw it down sufficiently low for separate suture of the rectum to become unnecessary.

B. If the perinæum is still very resistant, and the fistula is situated above a sphincter which has remained almost intact, the



Fig. 417.—Stitches after vertical section of the perinæum, and its "dédoublement."
Arrangement of the stitches at the end of the operation.

disadvantages of commencing the operation by section of the perinæum would outweigh the advantages. For the "dédoublement" in this case the surgeon should follow the method which Lawson Tait applies to incomplete rupture of the perinæum, by first separating the perinæum and then the recto-vaginal septum to above the fistula. Before stitching up the perinæum it will be well to close the rectal orifice by inserting from the side of the wound a series of Lambert-Lauenstein stitches (fig. 418). Further, the vaginal orifice should be closed from the vaginal side; for these purposes fine silk should be used. Säger* has had in this way many very successful cases.

* Säger, *loc. cit.*

Lastly, there are some cases, exceptional, it is true, in which the fistulous orifice is situated very high up in the neighbourhood of the posterior vaginal cul-de-sac. Here the example of Säger may be followed and free and deep "dédoublement" of

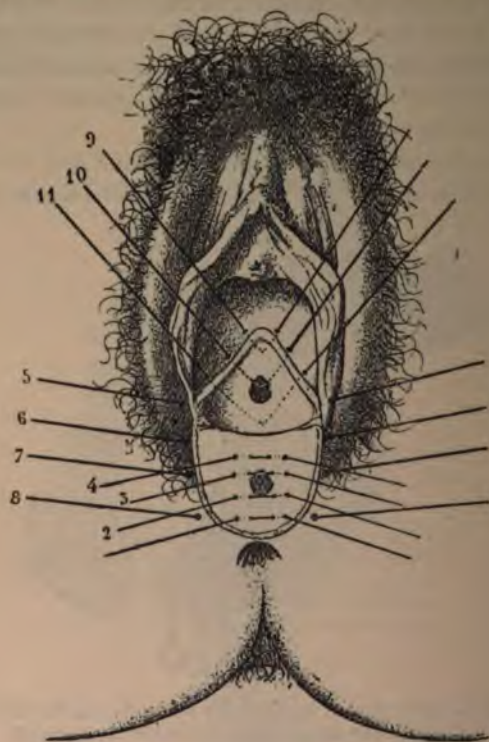


Fig. 418.—Vaginal, rectal, and perineal stitches after simple perineal "dédoublement," without preliminary vertical section.

1, 2, 3, 4, hidden Lanenstein sutures (silk) closing the rectal orifice; 5, 6, 7, 8, deep stitches (silver) for perineal apposition; 9, 10, 11, vaginal stitches (silver), the loop of which passes in front of the vaginal orifice which they are required to obliterate (Säger).

the perinaeum performed by means of a bi-sciatic incision, carried boldly up to above the fistula, across the levator ani muscle, the surgeon without hesitation making thus a wound deep enough to admit the two fists. This is the operation which was described above under the name of "transverse perineotomy." I think it preferable to stitch the fistula immediately from the

vaginal side after having freshened it; one would then limit oneself to lessening slightly the extent of the perineal wound, but its middle portion would be stuffed with iodoform gauze and left open. This is the method that Sânger followed with perfect success in a case where the fistula was exceptionally high up.

To this method may be approximated that which was first described by Alph. Guérin,* and afterwards by Quénu† and Félizet.‡ Quénu, following Guérin's example, combines separate suture of the rectum and of the vagina with "dédoublement"; moreover, he produces inaction of the sphincter ani by dividing this muscle behind and uniting the mucous membrane above it.



Fig. 419.—Operation for recto-vaginal fistula. Freshening with loss of substance by the vagina. Deep stitches.

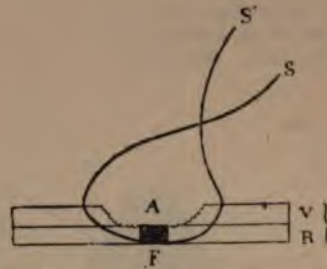


Fig. 420.—Operation for recto-vaginal fistula by vaginal freshening. Track of deep stitches.

Félizet does not stitch up the vaginal opening, but divides the rectal orifice down to the anus by incising the posterior leaf of the "dédoublement" from top to bottom; this last manœuvre does not appear to me to be of the least use.

Operation by the vagina.—This may be attempted at the outset in cases of small fistulæ, uncomplicated by cicatrices which render the vagina inextensible, when the perinæum is almost intact and the fistula is very high up, under which circumstances the operation through the perinæum necessitates very considerable separation of tissues, but as I have already said, the chance

* A. Guérin. Elements of operative surgery, 5th edn., Paris, p. 677.

† Quénu. Bull. et Mém. Soc. de chir., 1890, vol. 16, p. 595.

‡ Félizet, *ibid.*, p. 701 (P. Segond's report).



Fig. 421.—Operation for recto-vaginal fistula by the vagina. Method of autoplasic operation by "dédoulement." A, D, vertical incision; A, E, B, F, limits of the area of "dédoulement." (Sänger.)



Fig 422.—Operation for recto-vaginal fistula. Method of autoplasic operation by "dédoulement." Insertion of the deep stitches.

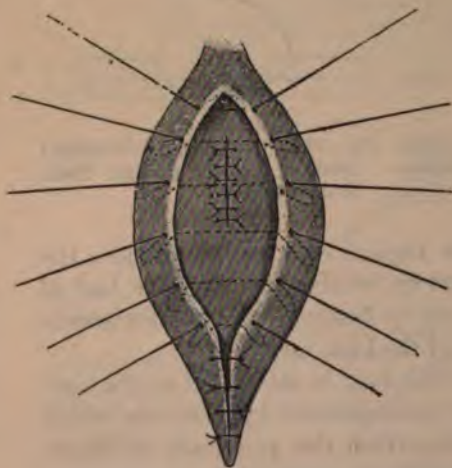


Fig. 423.—Operation for recto-vaginal fistula. Autoplasic operation by "dédoulement." Stitches tied over the rectal orifice. Deep stitches of the vaginal orifice not yet tied (Sänger).



Fig. 424.—Operation for recto-vaginal fistula. Autoplasic operation by "dédoulement." The vaginal stitches are inserted and tied. Insertion of the protective stitches on the rectal surface (Sänger).

of success is much smaller than by the latter method. Operation by the vagina is in all cases greatly preferable to an operation by the rectum, for the vulva is much more easily distended than the anus, at the back of which there is the obstacle presented by the coccyx; the vaginal mucous membrane is firmer, lends itself better to freshening, and bleeds less; lastly, and above all, the stitches are less exposed to infection.

Method of simple freshening with loss of substance.—The patient is placed in the dorso-sacral position, and the vagina is distended with a superior and two lateral retractors. The edges of the fistula are fixed by American bullet-extracting forceps. The recto-vaginal septum may be raised either by the finger of an

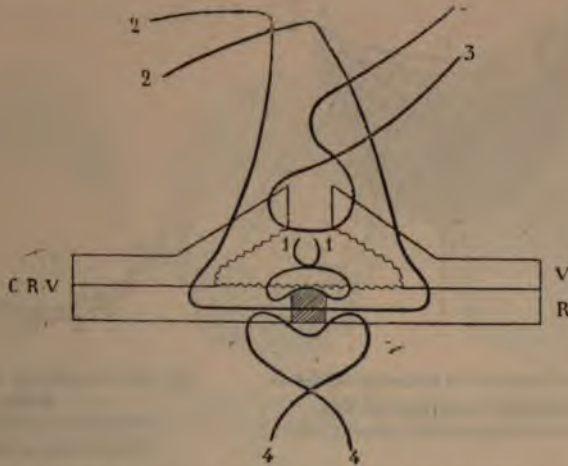


Fig. 425.—Operation for recto-vaginal fistula (diagram to show the arrangement of the sutures).

1, 1, hidden sutures of the rectal surface of the fistula; 2, 2, deep vaginal sutures; 3, 3, superficial vaginal sutures; 4, 4, protective sutures in the rectum (Sänger).

assistant or by plugging the rectum with iodoform gauze. It is better for the surgeon not to put his fingers into the intestine for fear of soiling them, which is possible however great care may have been taken before the operation to disinfect it by means of boracic injections.

The tissues are freshened very deeply by dissecting off the covering of the track, if one exist, down to the rectal surface (fig. 419). Stitches reaching to the rectal mucous membrane

(fig. 420) are inserted and pass beneath the whole extent of the wound, which is funnel-shaped. Superficial stitches are then inserted between the others, and including only the mucous membrane. The superficial stitches are tied before the deep stitches. It is better to use silver wire, which is the easiest to keep aseptic. In order to blunt the extremities of these wires a Galli tube should be crushed upon each of them, and should be cut off above the lower end. Care must be taken to arrange the line of stitches in the direction in which they will exert the least amount of traction; in the case of large perforations this is generally the transverse axis. If the perforation were very

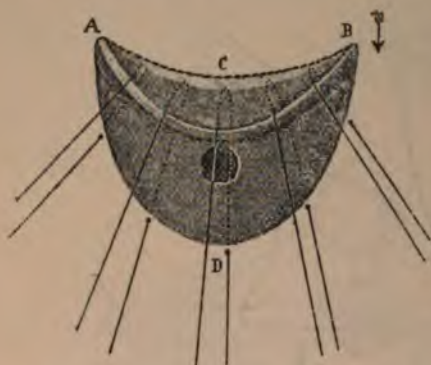


Fig. 426.—Operation for recto-vaginal fistula.
Autoplastic operation with flap.
Arrangement of flaps and of sutures (Fritsch).

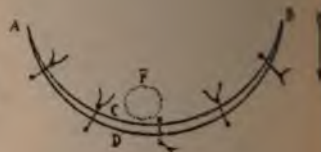


Fig. 427.—Operation for recto-vaginal fistula.
Autoplastic operation with flap.
The sutures are tied (Fritsch).

large, and in the immediate neighbourhood of the cervix, Simon's example should be followed, and the anterior lip should be freshened for the purpose of uniting it to the lower border of the fistula; the menses would then be discharged into the rectum.

Autoplastic operation by "dédoublement."—This mode of freshening, which was first put into practice for vesico-vaginal fistula by French surgeons, then more latterly taken up in Germany, and the description of which (after Walcher) I have already given, has also been applied to the treatment of recto-vaginal fistulæ. Säger owes to it a very successful case. His method is very like that of Walcher: he adds to it a protecting

suture from the rectal side. The following is the way in which he describes his mode of procedure.*

At a first stage the left index finger is introduced into the rectum, and the field of operation is brought into prominence and kept on the stretch by means of forceps suitably placed. A vertical incision extending beyond the fistula above and below for about $1\frac{1}{2}$ cm. is made in the median line, and does not include the rectum (fig. 421). The vaginal flaps are separated around the fistula. After retraction of the edges of these flaps, the fistula is found to be situated in the middle of a denuded surface of elliptical shape.

The rectal perforation is closed by six or eight hidden Lauenstein sutures of fine silk (fig. 418). Then the two vaginal flaps



Fig. 428.—Operation for recto-vaginal fistula by autoplasmic sliding flap. Arrangement of the flap and of the freshened surface (Le Dentu).

are stitched together above the fistula by deep horse-hair stitches (fig. 423), and superficial silk stitches (fig. 425). Säger, lastly, puts in a series of protective stitches in the rectum to prevent any insinuation of fecal material between the opposed surfaces. For the purpose of inserting the latter stitches he places the patient in Trendelenburg's position and dilates the rectum. The fistula thus brought into view is stitched up without freshening on this side with fine silk (figs. 424 and 425). Säger's patient was completely recovered at the end of sixteen days.†

* Säger, *loc. cit.*

† Säger lays particular stress upon the mode of stitching up the fistula (Lauenstein's suture) below the flaps. The surgeon must not hesitate to put in a large number of stitches in order to obtain more exact apposition. Chinese silk boiled in a 5 per cent. solution of carbolic acid and preserved in 1–500 corrosive seems to him preferable to catgut, which is absorbed too quickly.

Autoplastic operation by sliding flap.—This method, the first idea of which may be found in old surgical writings, has of late been successfully adopted by Fritsch* and by Le Dentu† in

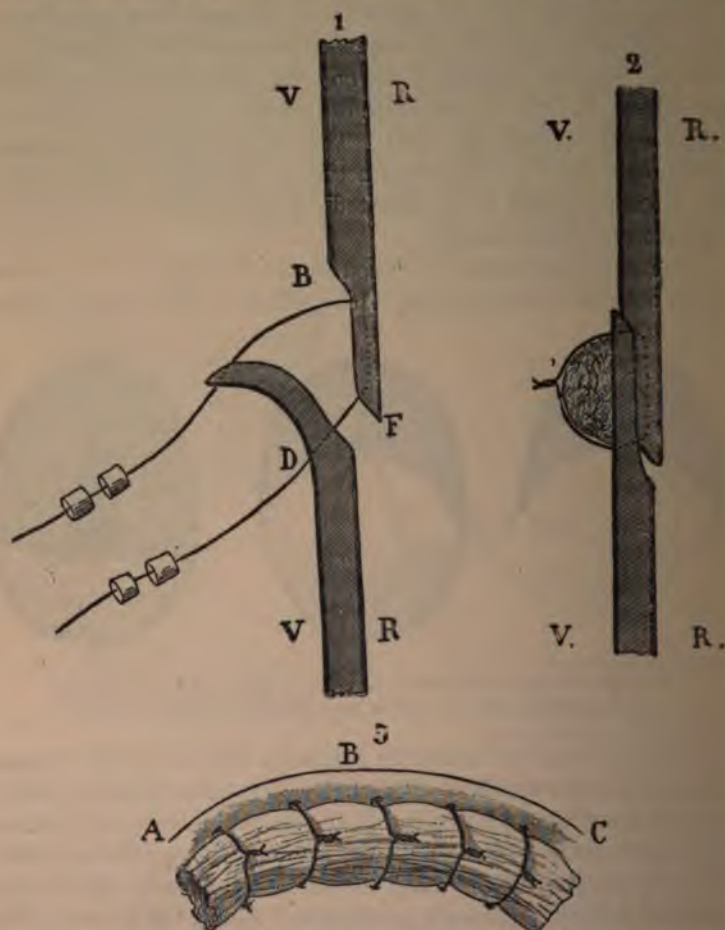


Fig. 429.—Operation for recto-vaginal fistula by autoplastic sliding flap.
Arrangement of the sutures (Le Dentu).

cases of small fistulæ situated high up in the vagina. It is a true autoplastic operation, and consists in cutting a vaginal flap

* Fritsch. Centr. f. Gyn., 1888, p. 804.

† Le Dentu. Bull. et Mém. Soc. chir., 1890, vol. 16, p. 590 and foll.

above the fistula and sliding it in front of the opening so as to form a kind of shutter for it (figs. 426 and 427).

First of all a curved incision, A, B, is made along the upper edge of the fistula F. The mucous membrane is separated beneath this incision for a short distance as far as C. A second and deeper curved incision, A, D, B, is made a little distance from the fistula, and, if necessary, a small crescentic strip composed of the indurated cicatricial tissues is excised from between these two incisions. Then the upper flap is drawn downwards and stitched to the lower edge of the wound, making the sutures pass beneath the whole of the raw surface. Fritsch has had by this method four successful cases; Sängcr has had one reverse.

Le Dentu has put into practice, successfully, a method which is identical in principle, but which differs from the preceding in several details. The following is his description * of this "autoplastic operation by sliding superposed flaps with valvular arrangement."

"1. Insert the index finger of the left hand, protected by an india-rubber glove, into the rectum. This precaution allows of the use of the same finger during the course of the operation without any risk of infecting the wound. The recto-vaginal septum thrust towards the vagina and largely distended is presented under suitable conditions for the necessary incisions and dissections. The same result may be obtained in other ways. The finger of an assistant, or even a small Petersen's balloon moderately distended, would serve the same purpose, but with this difference, namely, if the surgeon use his own finger he gains much more satisfactory information concerning the thickness of the septum, and of the depth at which he is making his dissection. And this is the reason why the use of an india-rubber glove is perhaps preferable to everything else.

"2. With a sharp-pointed knife trace out the curved incision A, B, C (fig. 428), passing at least 1 cm. above the fistula; then trace out another curved incision A, F', C, which must reach to the level of the lower border of the fistula. Freshen the vaginal mucous membrane over the whole crescentic surface included between the incisions A, B, C and A, F', C.

"3. Dissect down the vaginal mucous membrane from above downwards, from the incision A, F', C to a line represented (fig.

* Le Dentu. *Loc. cit.*, p. 500.

428, A), by the interrupted line A, D, C. The lowest point, D, of this curved line, representing the base of the dissected flap, should be a good centimetre below the fistula, so that the distance F', D is equal, or very nearly equal in length, to the distance B, F.

"4. The flap A, F', C, D being turned downwards towards the anus (fig. 428, B) the surgeon sees before him a large raw surface, formed in part from the freshening of the vaginal mucous membrane (A, B, C, F'), and in part from the dissection of the flap A, F', C, D. The operation consists essentially in drawing this flap upwards and adapting it by its under surface to the freshened surface A, B, C, F; but if the surgeon were to be contented with simply sliding it upwards, he would form at the base of this flap a cul-de-sac in which would accumulate any material passing by the fistula. It is absolutely necessary, therefore, to do away with this cul-de-sac, and this is done by following out the steps forming the next stage.

"5. With scissors eliminate the triangle F, I, K (fig. 428, B), which is cut at the expense of the tissues situated below the fistula. Divide the upper flap on each side at the points I and K, midway between the middle and extremities of the line A, D, C (fig. 428, C). In this way the rectum is freely opened beneath the fistula, and there no longer remains a pocket between it and the base D of the flap A, D, C, F.

"The stitches have now to be put in. This stage needs extreme carefulness. The surgeon must have at hand ten fairly fine silver or silk sutures, threaded at each end upon needles, also very fine, and having a moderate curvature. According to the extent of the fistula he must expect to use five to eight of these sutures, or more if the fistula be of very considerable size. This is the manner in which they are inserted:

"6. Insert a needle bearing one of the extremities of a suture at the point B of the upper flap, cut at the expense of the rectal mucous membrane, and bring it out at F, after having made it traverse the thickness of the flap as deeply as possible without entering into the rectum. Then pierce the lower flap at the points D (base) and F' (summit) with the two needles (fig. 429, 1). By drawing upon the two ends of the suture, and pushing the lower flap backwards, the posterior raw surface of the latter is adapted to the correspondingly raw surface of the upper flap.

To keep them in apposition it is sufficient to fix the two ends of the suture by means of two Galli's tubes, of which the more superficial is crushed, but care must be taken not to draw it at all tight, because then, in consequence of the swelling of the flaps, the Galli's tubes might become lost in their thickness, and lead to ulceration and perforation.

"Again, the sutures may be fixed over a small roll of iodoform gauze interposed between their free extremities on the anterior surface of the lower flap (fig. 429, 2). In any case the sutures must not be tied immediately over the flap without interposition of iodoform gauze, which would produce puckering, and consequent diminution of the extent of the apposed surfaces. The use of Galli's tubes or of fixation over a small roll of gauze ensures the spreading out of these surfaces, and correspondingly increases the chance of success.

"All the sutures are inserted successively in the same manner.

"When the sutures have been completely inserted the lower flap exactly covers the upper flap (fig. 429, 3). The fistula is completely done away with, and the rectal mucous membrane which forms the posterior surface of the upper flap, extending slightly beyond the line of junction on the rectal side, forms a small valve over which intestinal gases and solid matters pass quite naturally towards the anus. There is not the slightest tendency for them to return upwards towards the vagina by becoming insinuated between the flaps."

Operation by the rectum.—Fistulæ situated in the upper part of the vagina sometimes resist all attempts at obliteration through this canal (Simon). It may also happen that a recto-vaginal co-exists with a vesico-vaginal fistula, and that the incision of the cicatricial masses in the vagina, necessary for the satisfactory exposure of the rectal perforation, may run the risk of leading to incontinence of urine by relaxing too much the vaginal walls, contraction of which alone keeps the walls of the urethra in contact (Emmet). In such cases it has been thought advisable to attack the fistula from the rectum.

The woman is placed in the dorso-sacral or in the lateral position. The operation is commenced by forcible dilatation of the sphincter ani, so as to overcome its resistance; the cavity of the rectum is exposed by means of short retractors; the parts around the fistula are drawn down and fixed by means of forceps

and hooks. Continuous irrigation during the operation will be extremely valuable in washing away the blood which flows with considerable freedom as the result of freshening. Of course the surgeon will obtain help from introducing his finger into the vagina. Suture here is somewhat peculiar; according to the precepts laid down by Simon, the needle is to be inserted in the immediate neighbourhood of the rectal wound, but pushed towards the vagina so as to come out in this canal about 5 cm. from the edges of the perforation. Sometimes it may be easier to insert the stitches from the vagina, observing the opposite order. Above all, care must be taken to avoid the inclusion of the rectal mucous membrane between the lips of the wound where it has a tendency to insinuate itself. Silver sutures and Galli's tubes should be used as in the previous case; the ends of the wire will be situated in the rectum, and should be covered by a strip of iodoform gauze, the end of which passes out by the anus.

Preliminary and after treatment.—Previous treatment is necessary to prepare the patient for operation; repeated purgatives, enemata, half-diet, and finally thorough antisepsis of the vagina and rectum. To this it will be well to add antisepsis by the administration of naphthol and salicylate of bismuth.

The dressing will consist in the application of powdered iodoform and antiseptic gauze, which must be renewed every day. The patient should have the catheter passed for the first few days to avoid any flow of urine over the vulva and sutures.

Should patients be given any intestinal astringent? Some authorities support this view, and administer opium for ten or twelve days, hoping that by this time the cicatrix will be sufficiently firm to resist the fecal material that will then have to be expelled. Other surgeons, fearing the excessive action that will of necessity occur after no action has been had for this length of time, administer laxatives; but the liquid feces insinuate themselves between the stitches and infect them. Hegar recommends the following course, which seems to me to be very judicious: he purges the patient thoroughly before the operation, and only allows her milk and broth during the first three days; on the evening of the fourth day he gives a small dose of calomel, and on the morning of the next day a glass of some mineral purgative water; after the second stool, the intestinal action is

stopped by a little opium. In this way action of the bowels is induced every forty-eight hours.

The wire sutures may be left *in situ* for a fortnight unless they cause ulceration; they are always to be taken out from the side on which they are twisted and fixed. With regard to the silk sutures they become infected at the end of a week, and cannot be kept in longer without provoking inflammation.

ENTERO-VAGINAL FISTULÆ.*

By this name is meant communications which may be formed between the vagina and the intestine with the exception of the rectum.

These fistulæ might be called "unnatural vaginal ani" or "stercoro-vaginal fistulæ," according to their size and the quantity of material which passes through them. One of the first cases of this kind was published by MacKeever.† Others have been related by Roux,‡ Casamayor,§ Ashwell, Breitzmann, Simon, Demarquay,|| &c. L. H. Petit¶ has collected all the cases scattered through medical literature and has united them in a very full monograph.

Ætiology.—In the vast majority of cases it is rupture of the posterior vaginal cul-de-sac during parturition which is the cause of the evil. A loop of intestine passes through the perforation, becomes adherent, and sloughs more or less completely, either as the result of a rapid process of strangulation, or of a slow process of ulceration. Direct injury may have the same effect, but is extremely rare; the same holds good for wounds inflicted by the surgeon during the progress of certain operations, such, for example, as vaginal hysterectomy; suppuration of

* I shall simply confine myself to alluding to entero-uterine fistulæ which are extremely rare, and the symptomatology of which is still ill-defined. For a description of them I refer the reader to L. H. Petit's paper, "Unnatural ileo-vaginal anus and intestino-uterine fistulæ" (*Ann. de Gyn.*, 1882, vol. 18, p. 401; *ibid.*, 1883, vol. 19, p. 353, and vol. 20, p. 22).

† MacKeever. Practical remarks on laceration of the uterus and vagina, with cases. London, 1824, pp. 41—58.

‡ Roux. *Bull. de l'Acad. de Méd.*, April 10, 1828.—*La Clinique des hôp.*, 1828, No. 23, p. 129.

§ J. A. L. Casamayor. *Journ. hebdom. méd. de Paris*, 1829, vol. 4, p. 170.

|| Demarquay. *Gaz. méd. de Paris*, 1867, p. 341.

¶ L. H. Petit. *Loc. cit.*

dermoid cysts or of extra-uterine gestations which have opened at the same time into the vagina and the intestine is an exceptional cause. With regard to perforations caused by cancerous ulceration they do not enter into the category of the permanent lesions that we are considering.

Pathological anatomy.—The posterior vaginal cul-de-sac is the almost exclusive seat of this abnormal opening. Brietzmann* and Dahlmann† have seen the fistula open into the anterior cul-de-sac. The portion of intestine most frequently affected is the last portion of the ileum, but fistulæ of the sigmoid flexure have also been observed.

The opening is very large when the whole of a coil of intestine has been eliminated: it may be double and separated by a spur; this condition, however, is very rare. At other times there is a cleft only. Cicatricial bands have been known to exist in the neighbourhood and retract the vagina. The cervix is changed as the result of the metritis which is induced by the constant infection of the vagina, itself always inflamed.

The lower end of the intestine has a great tendency to atrophy and become obliterated; in Casamayor's case it had become converted into a solid cord. A vesico-vaginal fistula is sometimes present in addition. If a fistula is situated on each side of a cystic cavity it may be called "ileo-cysto-vaginal." (Petit.)

Symptoms.—When the communication is very large the greater part or the whole of the fæces may pass into the vagina; in a word, there exists a vaginal anus. The matters appear about two hours after a meal, have the appearance of incompletely digested food mixed with bile, and are about the thickness of soup. The nature of the stools and the time of their appearance after food yield valuable information as to the seat of the perforation. The opening itself may sometimes be felt on digital examination, and may fairly easily be seen by putting the vaginal walls on the stretch by means of retractors and placing the patient in various positions.

When small, several examinations may be necessary for the discovery of the perforation. Menstruation is often arrested, and this may principally be attributed to the enfeeblement of the patients, who are exhausted by inanition, the result of

* Breitzmann. *Med. Zeit. preuss. Vereins*, June 26, 1844, p. 122.

† Dahlmann. *Arch. f. Gyn.*, 1880, vol. 15., p. 122.

an incomplete absorption of food. Nevertheless a patient of MacKeever's became pregnant.

A small fistula may possibly close up spontaneously under the influence of good hygiene and absolute cleanliness. But if the perforation be large the lesion is generally definitive; the patients die of marasmus. Petit cites two exceptional cases in which recovery occurred after sloughing of a coil of small intestine.

Diagnosis.—As soon as the surgeon has recognised the presence of intestinal contents in the vagina, and has made certain that they owe their presence to some abnormal communication, the site of that communication has to be made out. The opening should be sought by straightening out the folds and rugæ, and passing the probe over them. If it cannot be found, the cervix uteri must be dilated and investigation made here also.

The portion of intestine in which the perforation is situated will be suspected from the characters of the materials that come therefrom. Faecal matter from the small intestine is very liquid, greenish or yellowish; in it are recognisable portions of food, and particularly of vegetables (skins of haricot beans, lentils, &c.), which are not affected by the digestive juices. Stools appear two or three hours after a meal, if the lower portion of the ileum be involved; if they appear more rapidly, the opening into the intestine is higher up; but if they appear later, are of a more solid consistency, and are of faecal appearance, the perforation is in the sigmoid flexure.

The condition of the opening must be carefully made out, while the error of mistaking the neighbouring cervix uteri for a second fistulous orifice must be guarded against. If two openings are found separated by a spur, the upper end may be distinguished by the fact that it gives exit to fæces; the permeability and direction of the two ends will be made out by the careful passage of a flexible sound or catheter. If the vagina be very narrow, and do not allow of a thorough examination, the injection of enemata of milk has been recommended; the cicatricial bands may also be gradually dilated or divided at one or two sittings. Rectal examination should always be performed along with passage of a probe through the fistula, and the surgeon will thereby satisfy himself that the opening is above a point to which the finger can reach.

Treatment.—If the case be one of a very small fistula, giving exit only to a small quantity of faecal material, and evidently only involving a lateral portion of the intestine, first of all recourse may be had to cauterisation with the thermo-cautery, just as if the case were one of recto-vaginal fistula. After several fruitless attempts, ample freshening and suture should be resorted to.

But the case is very different when the intestinal perforation is terminal and the whole of the contents of the gut are passed into the vagina. The best operation then appears to be that which O. W. Weber and C. Heine* followed with success; it consists in first re-establishing the continuity of the bowel by resection of the spur so as to convert the vaginal anus into a stercoro-vaginal anus, and then in obliterating the latter by freshening and suture.

For the purpose of resecting the spur, these surgeons used Dupuytren's enterotome. Verneuil recommends the use of simple long catch-forceps; in order to make the constriction less forcible and the sloughing process less rapid, I advise that the blades of the forceps should be covered with a piece of gutta-percha tubing, and that the force exerted by them should be increased by gradual steps.

In cases where no favourable result could be expected from this method, I think laparotomy would be justifiable, with separation of the two ends of the intestine which are adherent in the vaginal cul-de-sac, stitching up of the opening into the vagina, and freshening and suture to one another of the two ends of the intestine. This operation would be the only reasonable one for an entero-uterine fistula. If the lower end were obliterated or considerably contracted, the upper end should be made to open into the nearest portion of the large intestine. The progress of abdominal surgery now-a-days perfectly justifies an operation which, when it was initiated by Roux,† no doubt was somewhat rash.

* Cf. Breisky. *Die Krankh. der Vagina*, Stuttgart, 1886, p. 202.

† Roux (cited by L. H. Petit, *loc. cit.*, case xi.) performed laparotomy, resected the intestine, which he had detached from the vaginal cul-de-sac, and proposed to stitch the upper end into the descending colon, at the same time obliterating the lower end of the small intestine. But in consequence of a faulty method, he took the upper end of the colon for the lower, and made the two stomachic extremities of the intestinal canal open into another, as was verified at the autopsy.

A method which certainly is quite as dangerous is that of making the upper end open into the rectum, which has been previously detached and passed through a button-hole in the recto-vaginal septum, as in the suggestion put forward by Jobert.

Colpocleisis, or obliteration of the vagina below the level of the fistula with previous formation of a free communication between the rectum and vagina, was suggested to Simon by his analogous operation for the indirect relief of vesico-vaginal fistula. It should not be had recourse to until the uterus has been previously obliterated by the operation of hysterostomato-cleisis.

Casamayor's* method is preferable; it consists in the formation of a path by which the fecal material can be directed towards the rectum after passing through the vaginal fistula. For the attainment of this object Casamayor introduced into the bowel by the fistula one of the blades of a pair of long forceps curved in the direction of the sacrum; the other blade he passed by the rectum. They were then locked, and after making certain that they included nothing between them but the tissues to be divided, he tightened them. A slough was thus made, and after it separated the feces were able to pass directly into the rectum; but they continued to pass by the vagina, and the patient succumbed a month later.

Verneuil† has suggested the following modification of Casamayor's method: 1. Perforation with a curved trocar of the recto-vaginal septum 1 centimetre below the fistula, and passage through it of a gutta-percha tube; 2. Perforation in the same way of the ileo-rectal septum about 3 centimetres above the first puncture, and passage through this opening of a second gutta-percha tube; 3. Firm ligature together of the two rectal ends; a loop is thus obtained, of which the two ends come out into the vagina, one by the abnormal anus, the other below it, while the middle portion answers to the partition which it is desired to divide. It is only necessary to tighten these india-rubber tubes, and by their elasticity they bring about section.

Verneuil has not had occasion to put this ingenious device into practice. One cannot therefore know whether the diversion of the feces thus towards the rectum would be sufficient to lead to obliteration of the vaginal perforation.

* Casamayor. *Loc. cit.*, p. 170.

† Cf. L. H. Petit. *Loc. cit.*

CHAPTER IV.

VAGINISMUS.

Definition. Division.—Historical survey.—*Ætiology. Pathogenesis.*—Pathological anatomy.—Symptoms. Hyperæsthesia with spasm. Hyperæsthesia without spasm.—Diagnosis. “Vaginismus superior.”—Treatment. Anti-spasmodics. Excision of the hymen. Dilatation. Section of the internal pudic nerve, and of the sphincter vaginae. Electricity.

Definition. Division.—Vaginismus, “vaginodynia” (Simpson), or “spasmus vaginae” (Kiwisch), consists in abnormal hyperæsthesia of the external generative organs, which may go as far as to lead to spasmodic contraction of the constrictor muscle of the vagina, and even of the other muscles of the pelvic floor. There are three distinct classes, or, more exactly, three different types of this disease:

1. Hyperæsthesia with spasm. 2. Hyperæsthesia without spasm. 3. Spasm without hyperæsthesia.

The first of these types is by far the most common, and the last the most rare.

An attempt has been made to form a division according to the seat of the spasm, and “vaginismus inferior” depending upon the constrictor muscle of the vagina has been differentiated from “vaginismus superior” depending upon cramp of the lower and more internal bundles of the levator ani (Hildebrandt).* I do not think that this division is worth keeping for clinical purposes, for spasm of the deeper part of the vaginal canal is quite an exceptional variety. With regard to “essential” or “idiopathic” vaginismus, it probably does not exist; the starting-point of the reflex, however, may not be demonstrable.

Historical survey.—It was Marion Sims† who delineated the

* Hildebrandt. Ueber Krampf des Levator Ani beim Coitus (Arch. f. Gyn., 1872, vol. 3, p. 221).—Revillout. Vaginismus superior, and vaginismus properly so-called (Gaz. des hôp., Aug., 1874, p. 798, and *ibid.*, 1881, p. 625).—P. Budin. The levator ani in the female (Prog. méd., 1881, p. 613).

† Marion Sims. Obetet. Trans., London, 1862, vol. 2, p. 856.

most complete picture of the condition we are now considering, and gave it the name by which it has since been known. Nevertheless it would be unjust to concede to him the honour of complete priority, and H. Leroux* has clearly demonstrated the credit due to his predecessors. As long ago as 1834 Huguier † devoted several pages to the consideration of spasmodic constriction of the vagina, and pointed out the similarity between this affection and spasmodic constriction of the anus. Some fairly precise views on this point are also found scattered through the writings of Dupuytren, ‡ Lisfranc, § Hervez de Chégoin, || Kiwisch, ¶ Simpson, ** and Scanzoni. †† All these authorities thoroughly pointed out the existence of hyperæsthesia of the valve and spasmodic contraction of the sphincter vaginae, but they did not attribute to them any precise nosological value.

Since Sims' description, writings have multiplied both upon the ætiology and the treatment of this affection. Amongst them I must particularly mention those of Debout and Michon, ‡‡ Putegnat, §§ Charrier, ||| Visca, ¶¶ Lutaud, *** Trélat, ††† Scanzoni, ††† Gallard, §§§ Daude, |||| Budin, ¶¶¶ Verneuil, **** Leroux. ††††

Ætiology. Pathogenesis.—Two conditions are necessary for the

* H. Leroux. Art. Vaginismus in the Ency. Dict. of med. sciences, 1887, p. 288.

† Huguier. Spasmodic constriction of the sphincter vaginae. Thesis, Paris, 1834.

‡ Dupuytren. Art. Fissure of the anus in Clinical Surg., 2nd edit., 1839.

§ Lisfranc. On excessive sensibility of the female generative organs, in Clin. Surg. at la Pitié, 1842, vol. 2, p. 263.

|| Hervez de Chégoin. On fissure of the anus (Union méd., May 8, 1847, p. 227).

¶ Kiwisch. Klin. Vorträge, 1849, vol. 2, p. 472.

** J. Y. Simpson. Med. Times, April 2, 1859, p. 333.—Edinb. Med. Journ., Dec. 1861, vol. 7, p. 594.—Diseases of women, 1872, p. 284.

†† Scanzoni. Wien. med. Woch., 1867, No. 15, p. 225, and ibid., No. 18, p. 273.

‡‡ Debout and Michon. Bull. de thérap., 1861, vol. 61, pp. 110, 154, and 300.

§§ Putegnat. On a somewhat rare and little known affection of the vagina (Med. Journ. of Brussels, 1861, vol. 33, p. 465).

||| E. Charrier. On spasmodic constriction of the vaginal sphincter. Thesis, Paris, 1862.

¶¶ Visca. On Vaginismus, Thesis, Paris, 1870.

*** A. J. Lutaud. On Vaginismus, Thesis, Paris, 1874.

††† Trélat. French Assoc. for the Advanc. of Science, Nantes, 1875, p. 982.

‡‡‡ Scanzoni. Lehrb. der Krankh. der weibl. Sexualorgane, 1875, p. 704.

§§§ Gallard. Clinical lectures on diseases of women, Paris, 1879, p. 391.

|||| L. Daude. On spasmodic contraction of the constrictor vulvæ. Thesis, Paris, 1880.

¶¶¶ Budin. Loc. cit., 1881, p. 613.

**** Verneuil. Med. Gaz. of Paris, July 1884, p. 315.

†††† Leroux. Loc. cit.,

appearance of vaginismus. 1. Great nervous excitability of the woman. 2. Some irritation of the external generative organs giving rise to and serving, so to speak, as a pretext for exaggerated reflex action on the part of sensory or motor nerves, with the consequent production of hyperæsthesia or of contracture. Most women, therefore, who suffer from vaginismus are young, of nervous temperament, and sometimes the subjects of hysteria. Nevertheless hysteria is not absolutely essential for the manifestation of vaginismus, as it may exist in the absence of that mental condition.*

The irritation of the generative organs has, in the majority of cases, its starting-point from attempts at defloration at the commencement of married life.

Schröder has pointed out the importance of the peculiar situation of the vulva in some women, in whom it is placed very far forward and encroaches upon the symphysis pubis in such a way that the urethral orifice and the vestibule are immediately presented to the penis, and are compressed against the symphysis in the first attempts at coitus. In certain cases, the urethra is pressed back and dilated, and it is even in its enlarged orifice that a kind of copulation takes place. Excoriations result therefrom, and the hyperæsthesia becomes so great that the slightest touch causes the most horrible pain.

In other women, the hymen is naturally very tough; in others, again, its orifice is sufficiently large for the penis to effect an entrance without tearing it. In both cases, whether the membrane be pushed inwards or dilated it becomes inflamed, thickened, and extremely sensitive. Violent and clumsy attempts at coitus, and incomplete erection of the male organ may also be a cause of vaginismus, the latter because it does not allow of rupture of the hymen.

Vaginismus is also seen in the case of women in whom the hymen has been completely ruptured, but in whom the myrtiform caruncles have become inflamed by any source of irritation whatsoever, or whose vulvæ present fissures.

Small polypoid tumours of the urethra, herniæ of the urethral

* Stoltz. *Med. Gaz. of Strasburg*, 1871—2, No. 16, p. 185, No. 17, p. 197, and No. 20, p. 233.—Scanzoni. *Loc. cit.*—Decraud. Severe hysteria complicated by vaginismus cured by internal and external administration of gold (*Med. Gaz. of Paris* 1878, p. 516).

mucous membrane irritated by coitus, lead to the same effect. Fissure of the anus may also sometimes lead to painful constriction of the sphincter vaginæ from a kind of radiation of the pain and spasm. Lastly, it has been asserted that some uterine affections, and in particular ulceration of the cervix, may have the same result.* Cases of vaginismus superior have even been related, induced by affections of the uterus or of the ovaries.† I believe that this is simply a misuse of terms, and that the name "vaginismus" has often wrongly been applied to simple painful phenomena without any true vulvar hyperæsthesia, and to the prohibitive movements which result therefrom.

All the foregoing facts relate to vaginismus of the most common type, in which the hyperæsthesia is accompanied by spasm. In some much rarer cases the latter is absent; this is seen in particular in the case of young virgins who have undergone no attempts at coitus, but who are not free from a suspicion of masturbation. Gosselin‡ has pointed out some cases in which the hymen was then extremely sensitive.

The elder Martin§ places much importance upon gonorrhœal infection transmitted to young women at the commencement of sexual intercourse.

Pathological anatomy.—The lesions are quite disproportionate to the intensity of the symptoms, as in all affections in which the nervous system plays the most important part. From this point of view vaginismus is very closely allied to fissure of the anus, and this comparison was made by the earliest observers. As a rule, signs of inflammation are found of the vulvar orifice, of the hymen, or of the carunculæ myrtiformes; or fissures, rhagades of the vulvar or anal orifice, or polypi or vascular tumours of the urethra. Sometimes nothing is discovered. The dilatation of the urethra which occurs is the result of attempts at heterotopic coitus.

Symptoms.—In the ordinary type of vaginismus there is hyperæsthesia with spasm. The onset of symptoms generally dates from the time of defloration, which has been performed either in an extremely violent, or in a hesitating and clumsy

* Trélat. *Loc. cit.*

† Hildebrandt. *Loc. cit.*

‡ Gosselin. Vulvar hyperæsthesia (*Clin. de la Charité, Paris, 1873, vol. 2, p. 467*).

§ E. Martin. Ueber den sogenannten Vaginismus (*Berl. klin. Woch., 1871, No. 14, p. 166*).—R. Fehrer. Zu den Neurosen der Scheide (*ibid., No. 15, p. 177*).

manner. But many cases are known in which the symptoms have appeared tardily in women who have long been married. The pain is the principal element, and has gained for the affection the name of vulvar neuralgia, or neurosis, or hyperæsthesia. It is sometimes noticed to be exactly limited to definite points, to relatively restricted areas situated upon the internal surface of the labia minora, the fourchette, certain carunculæ myrtiformes, or the neighbourhood of the meatus urinarius. In other patients the whole of the vulvar orifice shares in the hyper-sensibility.

There is no doubt that the clinical type of hyperæsthesia without spasm *does* exist, but it does not constitute the most common variety, and Gosselin has gone much too far in denying the existence of spasm of the constrictor vulvæ, as he denied the existence of spasm of the sphincter ani in fissure of the anus. The exquisite sensibility of the vaginal orifice may be so great that simply touching with a feather may be unbearable. As a rule, however, one can succeed in inserting the little finger, and then one can appreciate (when it exists, for it is not constant) the spasmodic contracture provoked by the pain. This spasm may involve the neighbouring muscles; the sphincter ani in particular may be excessively hard, so that in one case the patient took it for a tumour (Sims). Verneuil* believes that the seat of the spasm is generally found less in the sparse fibres of the constrictor vaginæ, which in his opinion are incapable of producing it, than in the transverse perineal muscle, and in the generally muscular perinæum. The spasm may extend to the urethral canal.† A painful sensation and a feeling of weight in the perinæum render walking difficult.

It is at the entrance to the vagina, or a little above, that the tetanic contraction occurs. But the levator ani may also take part, and then the spasm extends into the deeper parts. Coitus is impossible, and sterility consequently is the rule. Nevertheless impregnation has been known to occur, the semen poured out over the vulva penetrating into the vagina by capillarity. Vaginismus may cease during pregnancy and reappear after parturition. Benicke‡ has reported a case in which parturition was impeded by symptoms of contraction. Nevertheless it is

* Verneuil cited by Visca, *loc. cit.*

† Dolbeau. *Gaz. des hôp.*, 1868, p. 263.

‡ Benicke. *Zeitschr. f. Geb. u. Gyn.*, 1878, vol. 2, p. 262.

common for delivery to cause definite disappearance of the morbid phenomena.

Various neuralgic pains are often found at other points in the body.

The general health is soon altered by the persistence of the pain, and the moral preoccupation of this special kind causes the patients to fall into the class of hypochondriacs.*

Diagnosis.—With vaginismus must not be confounded dyspareunia (Barnes), or simple pain during coitus, which is a phenomenon common to the majority of diseases of the generative organs.

Imperforate hymen, atresia of the vagina, will immediately be recognised on inspection; moreover, they coincide with absence or retention of the menses.

Simpson and Hildebrandt have described a contraction of the levator ani which a few women can bring about voluntarily under the name of the phenomenon of "penis captivus." This is merely a physiological curiosity which is absolutely distinct from the ordinary type of vaginismus; to the rare cases in which this contraction takes on a pathological character, the name of "vaginismus superior" has been applied.† In the greater number of cases it is a spasm without hyperæsthesia. It has been accused, but without proof, of being an obstacle to impregnation.

Treatment.—The object of the treatment should be to diminish the morbid hyperæsthesia, and to treat the lesions which call it into play. The first care of the practitioner must be to remove all causes of sexual excitement.

Anti-spasmodic treatment should be instituted; hydro-therapeutics and bromide of potassium will especially be of great value. To them should be added local applications of cocaine, belladonna, opium, &c. But the principal indication is to do away with the local cause which is the starting-point of the reflexes. The vulvitis must be cured; for this purpose will be ordered sitz-baths, frequent use of boracic or other lotions, anointing with boracic or iodoform vaseline, slightly caustic

* Arndt. Berl. klin. Woch., 1870, No. 28, p. 314.

† Simpson. Edinb. Med. Journ., Dec., 1861, vol. 7, p. 594.—Hildebrandt. *Loc. cit.*, p. 221.—Revillout. *Loc. cit.*, p. 793.—Budin. Remarks on physiological and pathological contraction of the levator ani muscle in the female (*loc. cit.*, p. 613).

applications for the fissures, such as a solution of silver nitrate 1 in 20, powdered iodoform, &c.

Then any neighbouring lesions must be attacked, as they keep up the state of irritation; if a fissure of the anus exist, the sphincter must be dilated; if a polypus of the urethra be present it must be excised, &c.

An inflamed, thickened, incompletely ruptured hymen, or even the remnants thereof, is very often the starting-point of the pain, although it does not play the exclusive part that Sims attributed to it in his earliest publications. Excision of the hymen or of the carunculæ myrtiformes will often suffice to cause cessation of the pain. This small operation will easily be performed with curved scissors, cocaine alone being used as the anæsthetic. A continuous suture will bring about immediate union of the wound. At the end of a few days gradual dilatation should be commenced. The woman while taking a sitz-bath introduces into her vagina a series of bath-specula of increasing size, first of all well covering them with vaseline. If attempts at coitus still cause pain, forcible dilatation under an anæsthetic should be had recourse to. In that case the same method should be adopted for the vaginal sphincter as for the anal sphincter in cases of fissure of the anus; the middle and ring fingers of both hands should be introduced into the vulva, and pressing alternately upon the various points of the opening should bring about the greatest possible amount of distension that can be obtained without rupturing the skin.

At the present day surgeons are much more loth to resort to cutting operations for vaginismus than they were formerly. No one now thinks of dividing the internal pudic nerve, as was suggested and performed by Simpson, and few surgeons still perform Sims' operation, or section of the sphincter vaginæ. The following is the operation referred to. The patient being chloroformed, two fingers of the left hand are introduced into the vagina. An incision is then made on each side of the fourchette, 5 cm. in length, and extending to $1\frac{1}{2}$ cm. from the raphe of the perinæum. Together, these two incisions are in the shape of the letter Y; the lower third of the incision implicates the perinæum. Sims used immediately to forcibly dilate the orifice by plugging it with cotton wool, which was removed the following day to be replaced by a glass dilator. The latter was

left *in situ* two hours during the night and two hours during the day for several weeks. I must, lastly, mention the use of electricity, which appears to have been of remarkable value in two successful cases of Lomer's.*

As the patients are generally very anæmic, the surgeon must not neglect to put them upon a tonic treatment. Lastly, great attention must be paid to the mental condition of certain women, especially those who have a hereditary disposition to insanity. Amusement, change of scene, or a voyage should be ordered if possible.

* Lomer. Zwei Fälle von Vaginismus geheilt durch den galvanischen Strom (Centr. f. Gyn., 1889, No. 50, p. 869).

BOOK XV.

DISEASES OF THE VULVA.

CHAPTER I.

RUPTURED PERINÆUM.

Pathogenesis. Ætiology.—Pathological anatomy.—Symptoms.—Diagnosis.—Prognosis.—Treatment. Recent rupture; immediate suture; immediate secondary suture. Ruptures of long standing. Historical survey of perinæorrhaphy. 1. Incomplete rupture and relaxation of the perinæum: Simon's operation; Emmet's operation; Lawson Tait's operation. 2. Complete rupture: Simon and Hegar's operation; Freund's operation; Hildebrandt's operation; Heppner's operation; Lauenstein's operation; A. Martin's operation; Le Fort's operation; Richet's operation; Emmet's operation; Lawson Tait's operation; Simpson's operation; Fritsch's operation.—After-treatment of perinæorrhaphy.—Prognosis and results.—Choice of operation.

Pathogenesis. Ætiology.—The perinæum is a resistant fibromuscular layer which closes in the abdominal cavity below and supports the weight of the viscera which are contained in that cavity. Looked at from within outwards, it presents the appearance of a widely everted funnel, taking its attachments from the pelvic bones and excentrically pierced at its anterior portion by an opening for the passage of the vagina. Looked at from the outside, the perinæum is reduced to the space between the fourchette and the anus, forming the base of a kind of triangular pyramid; its deep layer corresponds to the skin and to the interlacing of the constrictor vulvæ, the sphincter ani, and the transversus perinæi muscles, while the summit of the pyramid is lost in the recto-vaginal septum. One of the sides is bounded by the vagina, and its lower end is bordered and indented by the hymen or its remains; the other side is close to the rectum; the lateral portions of the perinæal prism have as deep supports the internal edges of the levatores ani, which are attached to the

sides of the rectum. These muscles, by the interlacing of their fibres below, really give support to the whole region.

At the moment of parturition the vulva has to allow of the passage of the fœtus, the dimensions of which are excessive relatively to the orifice through which it makes its exit. This can only take place, without causing rupture, by means of a double artifice: swelling of all the soft parts in consequence of the intense venous congestion which occurs at the end of pregnancy, and the elasticity of the muscular and cutaneous layers.

When one or other of these two conditions is lacking, the perinæum gives way and ruptures. This accident occurs under diverse circumstances: exceptional rigidity of the tissues in women who have their first labour late in the child-bearing life, or who have a very narrow and contracted vulva; excessive size or an unreduced posterior presentation of the fetal head; too rapid expulsion of the head and shoulders; narrowness of the pubic arch; malformed pelvis having a too perpendicular position of the sacrum, which allows the head to be carried too far backwards, as occurs in cases of flattened or rickety pelvis; badly-performed application of the forceps; too sudden introduction of the hand into the vagina during version; syphilitic ulcerations, &c.

In delivery, therefore, it is not the cutaneo-mucous covering of the vulvar commissure which is the chief obstacle to distension, but the muscular fibres which lie immediately beneath it. According to Olshausen, these fibres are those of the constrictor vulvæ; according to H. A. Kelly, they are the most internal fibres of the levator ani at their insertion into the rectum. Budin* seems to attach less importance to the muscular layer, and thinks that the rigidity of the vulva comes from the hymen. Rupture of the hymen may, in cases of extreme distension, play

* B. Budin (*Semaine méd.*, 1887, p. 90) remarks that one has often to blame as the cause of rupture of the perinæum under normal conditions a mistake of an inexperienced accoucheur, who does not oppose the sudden exit of the head during a violent expulsive effort on the part of the mother, and who does not take the precaution of only allowing it to be born in the interval between two contractions. Once the sub-occiput is turned towards the symphysis the vis a tergo pushes the head too low, and it is the reaction of the perinæum that pushes the bregma, the forehead, and the face in turn forwards and upwards. The accoucheur ought to diminish the strain on the perinæum by pressing with his fingers from below upwards, so as to aid the movement of ascension of the forehead and the extension of the head.

the part, to use Pajot's simile, of the snip with the scissors given by a shop-assistant to the edge of a piece of calico, which he then proceeds to tear. Lacerations of the superficial soft parts, however, do not seem to be the initial phenomenon. I believe that first of all there occurs subcutaneous rupture of the muscular fibres that increase the resistance of the integument. This deep rupture may even not go any further if the vulva can be sufficiently dilated, and then, instead of an apparent rupture of the perinæum, we have only a weakening of the perinæum, the ætiological importance of which in the causation of prolapse of the genitals is very great.* It is only if the fourchette is not sufficiently elastic even after rupture of the muscular band which limits it on its deeper surface, that it gives way in its turn, and a ruptured perinæum results. This generally occurs a little towards the left side, but quite close to the median line, and extends for a longer or shorter distance; sometimes it does not pass beyond the limits of the integument; sometimes it includes the anal orifice, and extends for a greater or less distance up the recto-vaginal septum.

The mechanism of central ruptures, which are very rare, is quite similar; the head, ill-directed, passes backwards towards the centre of the perinæum, which it distends and causes to start forward; then, after the respite which follows upon the momentary diminution of the distension, it may return slightly, become directed towards the vulvar orifice and pass through it, causing here also a more or less extensive rupture. At other times, as in one of Simpson's cases, the child may be expelled through the central opening.† Various kinds of injury are also a cause of rupture of the perinæum, but are much rarer; they are injuries from horned animals, kicks, falling astraddle upon a pointed object, &c.

Pathological anatomy.—The following description is only applicable to old and cicatrised lacerations.

The rupture occurs at the fourchette a little on one side of the median line. It is said to be *incomplete* when it does not reach to the anus, but *complete* when it does.

Of incomplete rupture, moreover, we may distinguish two

* H. A. Kelly. Injuries and lacerations of the perinæum, in "A System of Gynæcology," Philadelphia, 1888, vol. 2, p. 726.

† J. Y. Simpson. Edinb. Med. Journ., July 1855, vol. 1, p. 1.

varieties, according as the fourchette alone is divided, or as the rupture is deeper and includes the muscular layer, without, however, rupture of the sphincter ani.

The vulva appears elongated backwards and gaping; at the fourchette is found a smooth cicatricial surface; if the lesion be

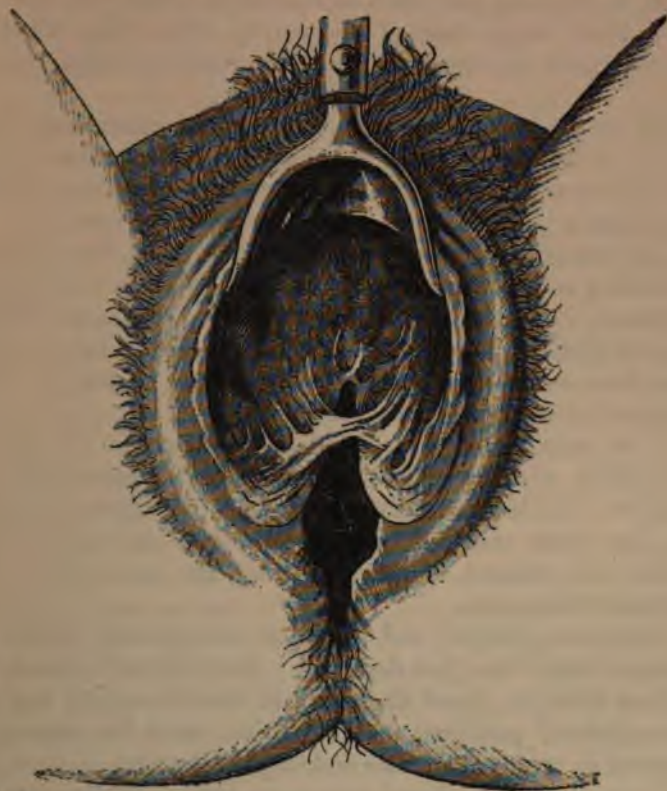


Fig. 430.—Complete rupture of the perinæum and of a portion of the recto-vaginal septum.

of long standing there is almost always a slight cystocele, and even some prolapse of the uterus.

In complete rupture the vulvar and anal orifices are united and form a kind of cloaca from which often project folds and rolls of hæmorrhoidal mucous membrane. The recto-vaginal septum is semicircular or pointed above; from the summit of the arch is sometimes pendant a small triangular strip of tissue.

The posterior column of the vagina is often isolated by two lateral ruptures which give it the appearance of a loose tongue. More frequently still the laceration has passed on the left side of this prominence. The cicatricial tissue modifies in the most variable manner the region, thickening one of the edges of the rupture, thinning the other, and sometimes throwing between them bands in the shape of bridges (fig. 430). This laceration of the septum may reach as high as the posterior vaginal cul-de-sac.

At the lower limits of the rupture the edges are drawn upwards by the contraction of the fibres of the levator ani muscle. Sometimes a small lateral dimple may be distinguished, which corresponds to the retracted stump of the sphincter ani.

Two varieties of complete rupture have been distinguished according as the sphincter and the anal orifice alone have been ruptured, or as the division has extended to the recto-vaginal septum (Gaillard Thomas). This distinction is of some importance from an operative point of view, for the reparation of the septum necessitates a special operation.

It is very common to find deep lacerations of the cervix coinciding with ruptured perinæum, and accompanied by metritis. Gaillard Thomas asserted that the vagina itself also in these cases remained in a sub-involuted condition.* Cystocele and prolapse of the uterus are also seen with a fair amount of frequency.

Symptoms.—Digital and specular examination reveal the changes that I have just described. For their performance the patient must be placed alternately in the dorso-sacral and the genu-pectoral positions, and the parts must be thoroughly exposed by means of anterior and lateral retractors.

Diagnosis.—The rational symptoms vary according as the rupture is incomplete or complete. In incomplete rupture all the troubles are referable to the gaping condition of the vulva, which favours the occurrence of cystocele, of prolapse of the uterus, and also of metritis. Moreover, it is not rare to hear women complain of great difficulty in walking, of vague pains which come under the domain of "enteroptosis," and depend upon the profound disorder introduced into uterine statics by the absence of perineal support. In complete rupture there is

* Gaillard Thomas. Dis. of women, French trans., p. 109.

incontinence of flatus and of liquid faecal material, solid faeces, however, being very well retained.* Nevertheless some patients, even with a rupture which seems to involve the whole thickness of the sphincter, are able to retain flatus so long as they maintain the horizontal position.

Prognosis.—This lesion is very wearisome, even when the rupture does not give rise to the infirmity which results from abolition of the sphincter ani. As a rule it renders patients incapable of any fatigue, and, moreover, it predisposes to prolapse of the internal generative organs, and keeps up the metritis which has often followed upon the parturition which was the prime cause of the whole condition.

Treatment.—*Recent rupture of the perineum.*—Cannot the surgeon often entrust repair to nature, which frequently brings it about of itself; or, on the contrary, is it better to aid and direct this process of repair, which is often insufficient or defective, by immediate suture? This question has been much debated, but it was especially at a time when ignorance of the benefits of antiseptis and aseptis rendered successful cases mere matters of chance. No doubt, as has been said, under certain circumstances it is better to do nothing, when, for example, the patient is greatly exhausted, or when the necessary assistance is not at hand, &c.† But such contra-indications are in nowise peculiar to this operation. In a word, the rupture should be at once repaired whenever that is possible; success has even followed when the parts appeared to be very greatly bruised and to lend themselves ill to an attempt at primary union. This course has the advantage of avoiding an ulterior and more complicated operation, and of closing the door to infection. Spontaneous cicatrisation, which is possible without intervention in the case of very superficial ruptures, is very exceptional in the case of deep ones. In spite of the fact that Pajot, Tarnier, and Guéniot, have seen examples of it, one dare not count upon similarly happy results.

The simplest and most expeditious method of obtaining union is by continuous suture in superposed layers,‡ which will be done by forcing oneself to re-establish the continuity of the

* G. Bouilly. *Manual of external pathology*, vol. 4, p. 319.

† Hegar and Kaltenbach. *Oper. Gynecology*, French trans., p. 611.

‡ Doléris. *Perineorrhaphy immediately after delivery by the continuous suture* (*Arch. de tocol.*, 1885, p. 174)

parts such as it was before, and profiting by the natural freshening, which results from the rupture, however extensive it may be. This suture is much to be preferred to the use of hooks, which are only satisfactory in lacerations of the cutaneo-mucous fold of the fourchette. Moreover general anæsthesia is not indispensable. Thanks to the rapidity of the operation, local application of cocaine, either with a brush or by hypodermic injection, produces quite satisfactory insensibility of the parts. The surgeon has not to bother himself afterwards about removing the catgut stitches, for they are absorbed spontaneously. Care must be taken to keep the patient's legs well adducted and forbid her to sit up in bed for a fortnight. Cleanliness of the parts must be most carefully looked after; they should be washed with sublimate solution and powdered over with iodoform.

When the surgeon has not been able to operate immediately, is it advisable, during the first month, to perform immediate secondary union, as has been suggested, either by bringing the granulating surfaces together, or by scraping the fleshy granulations with a sharp curette?*. Some successful cases have been obtained in this way, but nevertheless I think that the disadvantages of not waiting until the congestion of the parts has gone down, and the patient is in a better condition for bearing an operation, outweigh all other advantages.

Verneuil† has recommended immediate secondary union even in cases of long standing. He uses the thermo-cautery for the purpose of getting a freshened surface, and puts in the stitches when the sloughs separate. This method must not be confounded with cauterisation of the angle of the rupture similar to that practised by J. Cloquet for fissure of the palate; in some cases it has been useful in diminishing the size of an extensive division of the recto-vaginal septum. I have myself then resorted to it with success.

Ruptured perinæum of long standing.—Historical survey.—The first operation for ruptured perinæum by suture seems to have been conceived and proposed by Ambroise Paré, and put into execution for the first time by Guillemeau, a French sur-

* Maisonneuve. Bull. de la Soc. de chir., 1849, vol. 1, p. 263.—Nélaton. Elements of surgical pathology, vol. 5, p. 859.—J. Holst. Monatschr. f. Geb., 1863, vol. 31, p. 303.—E. Schwartz. Rev. de chir., 1885, p. 966.—H. Dayot. Contribution to the study of perinæorrhaphy. Thesis, Paris, 1886.

† Verneuil. Bull. et Mém. de la Soc. de chir., 1884, p. 314.

geon of the seventeenth century.* In the following century de la Motte, Smellie, Noël (of Rheims), Murena, Saucerotte attempted it with a greater or less amount of success.† During the present century Dieffenbach‡ in Germany was the promoter of a method which served as a model for numerous operations, and which was improved and introduced into France by Roux.§ The point which forms the essential characteristic of Dieffenbach, besides the large area of freshening, is the formation of liberating incisions, traces of which are to be found later in the division of the sphincter recommended by Mercier|| and by Baker Brown.¶ The essential point of Roux's operation was the suture over pins of a much larger wound than his predecessors had ventured to close. With Langenbeck a new method, "perineo-synthesis" takes birth. It was based upon a combination of freshening and autoplasty by "dédoublement"; it gave rise in France to the operations of Demarquay,** Richet,†† Le Fort,‡‡ Marc Sée,§§ and Polaillon;||| in Germany, to name the principal only, we must mention Simon,¶¶ Freund,*** Hildebrandt,††† Wilms,‡‡‡ Staude,§§§ Bischoff,|||| and Hegar.¶¶¶

In America, Marion Sims was applying in 1855 to rupture of the perineum the extremely simple and precise principles which had guided him in his operation for vesico-vaginal fistula.

* J. Guillemeau. Works on Surgery, Rouen, 1649.

† Cf. for the history Verneuil. *Gaz. hebdomadaire*, 1862, p. 369 (art. reproduced in the *Mém. de chir.*, vol. 1, p. 954).

‡ J. F. Dieffenbach. *Die operative Chirurgie*, Leipzig, 1845.

§ Roux. *Med. Gaz. of Paris*, 1834, vol. 2, p. 17.

|| Mercier. *Journ. des connaissances méd.-chir.*, 1839, p. 89.

¶ Baker Brown. *The surgical diseases of women*, London, 1866.

** Demarquay. *Gaz. des hôp.*, Sept. 24, 1864, p. 445.—E. Bourdon. On perineo-vaginal anaplasty. Thesis, Paris, 1875.

†† Richet. *Union méd.*, 1869, p. 63.—Picqué. *Internat. Encycl. of Surg.*, French ed., vol. 7, p. 753.

‡‡ Le Fort. *Malgaigne's Manual of operative medicine*, 9th ed., 1889, vol. 2, p. 716.

§§ Marc Sée. *Bull. et Mém. de la Soc. de chir.*, 1885, vol. 11, p. 360.

||| Polaillon. *Ibid.*, p. 242, and *Arch. de toc.*, 1885, p. 298.

¶¶ G. Simon. *Mittheilungen aus der chir. Klinik des Rostocker Krankenhauses*, 1861-1865, p. 241.

*** Freund. *Ueber Damplastik* (*Arch. f. Gyn.*, 1874, vol. 6, p. 317).

††† Hildebrandt. *Die Krankh. der weibl. Genitalien*. Stuttgart, 1877.

‡‡‡ Cf. Güterbrok (pupil of Wilms). *Arch. f. klin. Chir.*, 1879, vol. 24, p. 108.

§§§ Staude. *Zeitschr. f. Geb. u. Gyn.*, 1880, vol. 5, p. 71.

|||| Cf. W. Matzinger (pupil of Bischoff). *Zur Kolpoperineoplastik nach Bischoff* (*Wien. med. Blatt.*, 1880, vol. 3, pp. 703, 728, 758, 781, 802, 829, 854, 875, 901, and 972).

¶¶¶ Hegar and Kaltenbach, *loc. cit.*, p. 607.

Freeing the operation from every useless complication, and notably suture in several layers, he returned quite simply to Roux's operation, carried the freshening up higher, and substituted metal sutures. It was a very great simplification, which preceded and prepared the way for the operation of his pupil and friend Emmet.* The originality of the latter consists in the method of suture, which has the effect of approximating the wound and closing it as a purse is closed, and in the care given to approximation of the two ends of the divided sphincter by the insertion of a special so-called "sub-sphincterian" suture, very deeply and in a very oblique direction from behind forwards. This method, which was an improved modification of Marion Sims' operation, was brought into general use by Jude Hùe † (of Rouen), and at once adopted by the majority of surgeons. Verneuil ‡ and Trélat § notably rejected the methods they had previously practised to follow it.

For the moment it might be supposed that the operation had been reduced to its simplest form. This was not the case however; Lawson Tait, || improving a method that had been invented by J. Duncan and by Simpson ¶ (of Edinburgh), reduced the operation of perineorrhaphy to a rapid "dédoublement," followed by the insertion of a few stitches; the operation altogether lasting only five to ten minutes. This method was rapidly adopted in America and in Germany with or without modification.**

* T. A. Emmet. *Med. Record*, 1872, p. 121.—The principles and practice of Gynæcology, 3rd ed., 1885, p. 379.

† Gnéniot. Report on a paper by Jude Hùe (*Bull. et Mém. de la Soc. de chir.*, April 5, 1876, p. 291).—Kirmisson, *ibid.*, 1885, pp. 228, 237, and 240.—Jude Hùe, *ibid.*, 1886, p. 705.

‡ Verneuil. *Bull. de l'Acad. de méd.*, 1861, vol. 36, p. 173.

§ Boraud (pupil of Trélat). *Perineorrhaphy*. Thesis, Paris, 1879.

|| The first description of Lawson Tait's operation was given by Heiberg (of Copenhagen). *Om Perineorrhaphie til Lawson Tait's Methode* (*Gynæk. og obst. Meddel.*, 1887, vol. 6, part 3).—A very important paper was afterwards published by Säger. *Ueber Perineorrhaphie durch Spaltung des Septum recto-vaginale und Lappenbildung* (*Samml. klin. Vorträge*, 1887, No. 301). According to Säger, Lawson Tait was preceded in this modification of the operation by Voss of Christiania. But it must be confessed that his operations had created no impression.—See also Säger. *Centr. f. Gyn.*, 1888, No. 47, p. 765.

¶ Hart and Barbour. *Manual of Gynæcology*, French trans., 1886, p. 600.

** H. Fritsch (*Ueber perineoplastik*, in *Centr. f. Gyn.*, 1887, No. 30, p. 473) does not seem to have drawn his idea from Lawson Tait when he himself recommended dédoublement as the only mode of freshening; his mode of suture moreover differs entirely from that of Lawson Tait.

Amongst the surgeons who have adopted more or less completely Lawson Tait's

I cannot pretend to describe each of the operations that I have enumerated. I shall content myself with giving the details of only the chief amongst them. However, I have taken care to

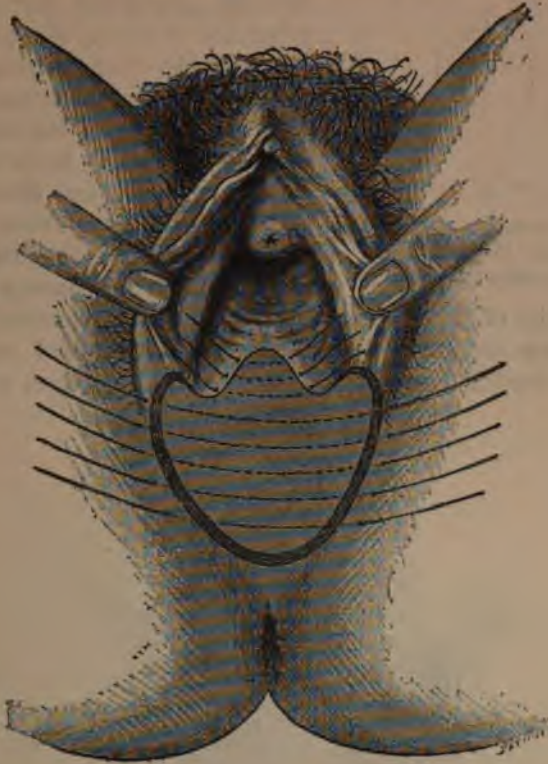


Fig. 431.—Incomplete rupture of the perinæum. Perinæorrhaphy, Simon's operation.

give the bibliography in sufficient fulness to make reference easy to the sources where the others are to be found.

1. *Incomplete rupture of the perinæum.*—All the operations of

operation, I will cite, besides Säger, Zweifel, *Deutsche med. Woch.*, 1888, p. 629.—Meinert. *Centr. f. Gyn.*, 1888, No. 40, p. 649.—Rokitansky. *Wien. klin. Woch.*, 1888, p. 249.—Schantz, Piering, Riedinger, *ibid.*, 1888, No. 26, p. 531. A. von Winiwarter, *ibid.*, 1888, pp. 631, 654, and 682.—Schubert. *Inaug. Dissert.*, Greifswald, 1888.—A. Martin. *Berl. klin. Woch.*, 1889, No. 6, p. 108.—Mendes de Leon (of Amsterdam). *Centr. f. Gyn.*, 1889, No. 23, p. 408.

On the other hand Lawson Tait's method has been opposed in Germany by Hirschberg (of Frankfort), Schatz, Hegar. Third German Congress of Gynecologists at Friburg, June, 1889 (*Centr. f. Gyn.*, 1889, No. 30, p. 515).

colpo-perinæorrhaphy that I have alluded to in the chapter on prolapse of the organs of generation find here an application. There is only a difference of degree and a great general similarity



Fig. 432.—Incomplete rupture of the perinæum. Perinæorrhaphy. Emmet's operation (diagrammatic).

between incomplete rupture and relaxation of the perinæum, which is one of the chief elements in the causation of the greater number of cases of prolapse of the vagina or the uterus. In the latter case the skin has resisted, and there is no external cicatrix, while the opposite condition obtains in the first. But they both have one common factor;

the tonicity of the deep muscular layer has been overstrained, the fibrous meshwork has been distended beyond recovery, and the statical conditions of the uterus have been modified

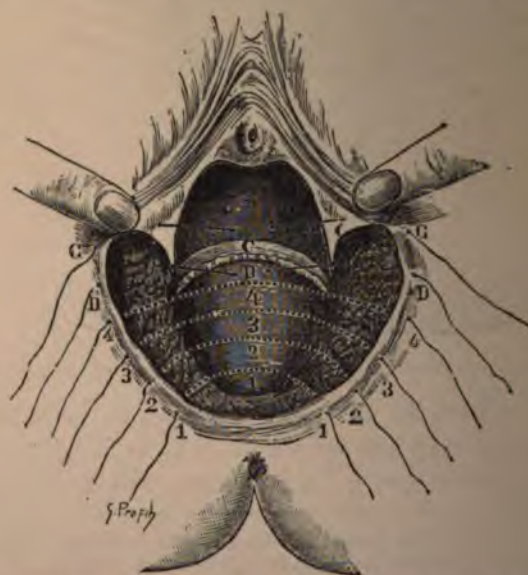


Fig. 433.—Incomplete rupture of the perinæum. Perinæorrhaphy. Emmet's operation.

in the same way in both cases. We might say that relaxation of the perinæum is really a "sub-cutaneous rupture." That this is the case can readily be appreciated by seizing

the tissues between two fingers introduced into the vagina and the rectum; one can then make out the diminution of the fleshy pyramid which separates these two canals, and its lessened consistency. This lesion coincides with widening of the fourchette, gaping of the vulva, which is made more marked by placing the woman in a semi-prone or Sims' position, diminished depth of the anal orifice, and a peculiarity that may be misleading, namely, unaccustomed breadth of the perinæum, which, however, has sunk downwards and has become spread out.

I shall not return to the means that may be adopted for giving consolidation to the perinæum. I have already described them; they are Hegar's colpo-perinæorrhaphy, A. Martin's perinæauxesis, Doléris' perinæoplasty by sliding flaps, &c.

I confine myself to figuring without describing Simon's operation for incomplete rupture* (fig. 431); this freshening and stitching operation inspired Hegar's method for treating complete rupture.

Emmet's operation.—The operation of this surgeon for incomplete rupture must not be confounded with his operation for complete rupture (to be described later), from which it is essentially different. The surgeon removes from the perinæum and on the internal and inferior side of the valva a strip of mucous membrane of the shape of two leaflets (fig. 433), as Baker Brown had done before him. Emmet also removes the mucous membrane from the whole of the lower part of the posterior vaginal wall abutting on the fourchette. The object he has in view is not to unite the left freshened surface to the right, as in other operations of the kind, by drawing them in some fashion inwards towards the middle line, but rather to draw the vaginal portion of the freshened surface behind the vulvar portion, which has also been freshened, so as to make them support each other and double the thickness of the perinæum. For this purpose the suture *C* (fig. 434), which traverses the labium majus above the freshening, passes in the portion of the vaginal wall, *C*, which has not been freshened. The suture *D* passes below the upper freshened surface on the labium majus, then in the freshened portion of the vagina, but only on the middle line, and is free for the rest of its extent; the sutures

* P. Zweifel. Die Krankh. der äussern weibl. Genitalien und die Dammriss: (Deut. Chir., Lief. 61, 1885, p. 116).

1, 2, 3, and 4, on the other hand, pass beneath the whole freshened surface in the substance of the labium and the septum, and are nowhere visible. When the sutures are tied the following result is obtained: the right portion (3) of the median vaginal leaflet (fig. 433) is brought into contact with the furthest portion (2) of

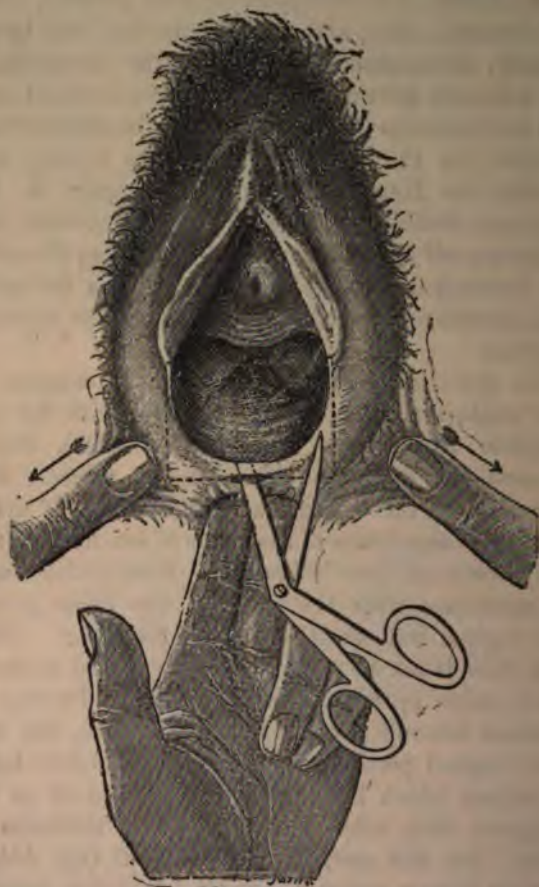


Fig. 434.—Incomplete rupture of the perinæum. Perinæorrhaphy.
Lawson Tait's operation. Freshening with scissors.

the freshened leaflet upon the right labium. The left vaginal portion (4) is applied to the posterior portion of the left labial leaflet (5). The external portions of the right and left labial leaflets (1 and 6) come together to re-establish the perinæum and

fourchette, and the points A, C, B are close together at the fourchette (L. Le Fort).

Lawson Tait's operation (for incomplete rupture).—I shall follow the description given by Sanger,* who has introduced a few unimportant modifications. This method is also suitable for simple relaxation of the pelvic floor; nevertheless the objection may be made that it often leaves a kind of cul-de-sac behind the newly-constituted perineum.

Sanger recommends the introduction, first of all, into the rectum of a plug of wadding, a sponge or a plug of iodoform gauze smeared with vaseline, and with a thread passed through



Fig. 435.—Incomplete rupture of the perineum. Perinorrhaphy.
Lawson Tait's operation. Freshening.

it. By this means the posterior vaginal wall is pushed forward. Two fingers are placed in the rectum; while an assistant puts the field of operation as much on the stretch as possible by drawing the sides of the vulva directly towards the tuberosities of the ischium; the posterior vaginal wall is then visible over a great extent of its surface.

* Sanger, *loc. cit.*—See also on the technique of this method: P. Mund. My experience with the flap-splitting operation (*Amer. Journ. of Obstet.*, July 1889, vol. 22, p. 673 and foll.).—N. Macphatter. Tait's flap operation for lacerated perineum (*ibid.*, p. 1146 and foll.).

Lawson Tait uses pointed scissors, set at an angle, like those of Roux. He thrusts their point into the tissues in the middle line, from before backwards, between the posterior commissure of the vulva and the anus, and he strips the lining off from the recto-vaginal septum, first on the left, then on the right, after having turned the scissors on themselves (fig. 434). Over the extremities of this transverse section he then makes two vertical incisions, which, starting from the line of junction of the labia majora with the labia minora, are directed below towards the

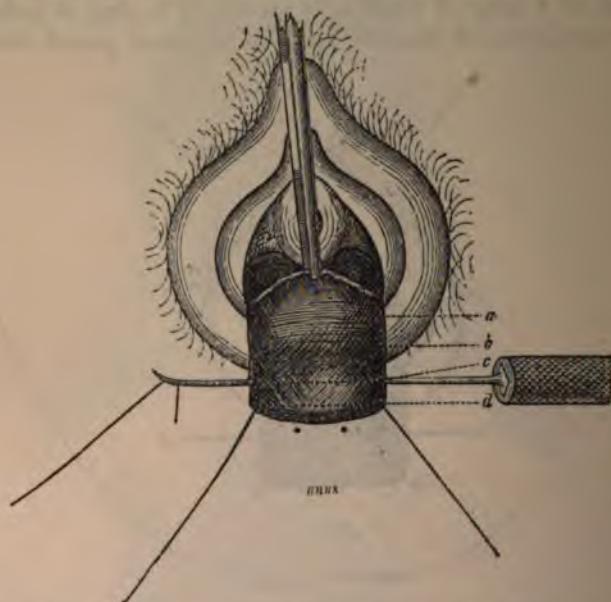


Fig. 436.—Incomplete rupture of the perineum. Perinæorrhaphy.
Lawson Tait's operation. Suture.

ends of the transverse surface that has been freshened with the scissors. Scissors may also be used for these two vertical incisions, only then the surgeon would commence from below and cut upwards towards the junction of the labia majora and minora. The three incisions thus form a quadrilateral surface, from which the upper side is wanting. The horizontal side is three-and-a-half to four centimetres in length, the two vertical sides two-and-a-half to three centimetres. The liberated vaginal flap, which is like a lid in shape, soon retracts upon itself by virtue

of its elasticity, and forms an irregular semicircle *a, c, b* (fig. 435), which now only covers a portion of the freshened surface, *a, d, e, b*. This freshened surface has the shape of a quadrilateral, with rounded angles; surrounded by skin on three sides, it gives an insertion on the fourth to the flap of mucous membrane resulting from the splitting of the recto-perinæo-vaginal septum. In order that the flap *a, c, b* may not be too thin, the recto-vaginal septum must be divided exactly midway between the two mucous surfaces, and this is easily controlled by the fingers placed in the rectum. At the edges, the incision of the tissues is carried deeper into the cellular tissue of the perinæum and the labium majus. The freshening may be completed in half-a-minute. The freshened surface is not perfectly level; it presents irregularities, which are removed by means of the scissors.

When the perinæum is not transformed into cicatricial tissue, the flow of blood is considerable, but comes from the veins. Sometimes arterioles are divided, but the use of clips and torsion are sufficient to arrest bleeding. Säger has never had occasion to ligature a vessel. If necessary, that is to say, if forcipressure and torsion were insufficient, ligatures of fine catgut should be used; in point of fact, the approximation of the edges of the wound would not be sufficiently close to assure hæmostasis.

The stitches are inserted under the control of the index and middle fingers of the left hand, which are introduced into the rectum; the point of a needle on a handle is inserted on the freshened surface itself directly inside its left edge, is passed transversely through the tissues, and brought out at the corresponding point directly inside the right edge. According to Lawson Tait's practice (which, personally, I do not imitate) the skin should not be included (fig. 436, *a, b, c, d*, represent the



Fig. 437.—Incomplete rupture of the perinæum. Perinæorrhaphy.

L. Tait-Säger operation.
Suture.

entrance and exit points of the needle). A silver suture is passed through the eye of the needle, which is then withdrawn in the usual manner. Four sutures are sufficient; one of them should penetrate into the recto-vaginal septum a little beyond the level to which it has been split. The wires are fixed (fig. 437) between the edges of the wound after it has been carefully washed with a solution of sublimate (1 in 1,000) and the plug introduced into the rectum has been withdrawn. The edges of the wound are brought into apposition; the line of union is not exactly rectilinear with the mode of suture adopted by Lawson Tait, because the silver stitches are obliged to come through the wound, but between them contact is perfect. Towards the anus there often remains a fold which corresponds to the inferior

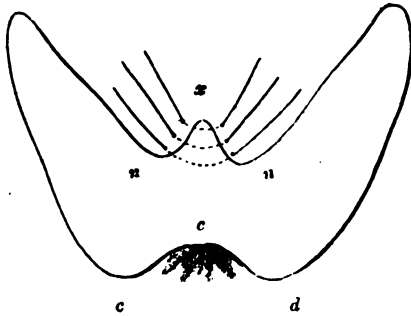


Fig. 438.—Complete rupture of the perineum.
Perinæorrhaphy.
Simon-Hegar operation. Freshening.

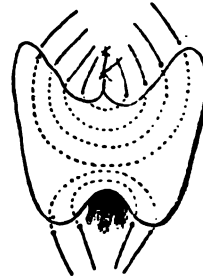


Fig. 439.—Complete rupture of the perineum. Perinæorrhaphy
Simon-Hegar operation.
Vaginal and rectal stitches.

transverse edge of the freshening of the side of the vagina; the liberated mucous flap forms a fold, open in front, or a small rosette.

Lawson Tait does not put in any superficial stitches. I agree with Sängner that it is preferable to insert them. If antiseptic precautions be taken there is no need, he says, of keeping, as does Lawson Tait, any external openings that may serve for drainage. He therefore puts in from four to six superficial stitches (fig. 437). The silver stitches may cut off level and a split shot placed on the extremities and crushed to prevent their injuring the tissues. The dressing, after the operation, consists in insufflation of iodoform, iodoform gauze, or cotton-wool impregnated with sublimate solution, to surround the extremities

of the silver stitches. Twice daily the part should be sprinkled with iodoform until there is a thick layer of it, behind which the wound remains perfectly dry. The catheter must be passed for the first three days. On the seventh day the superficial stitches

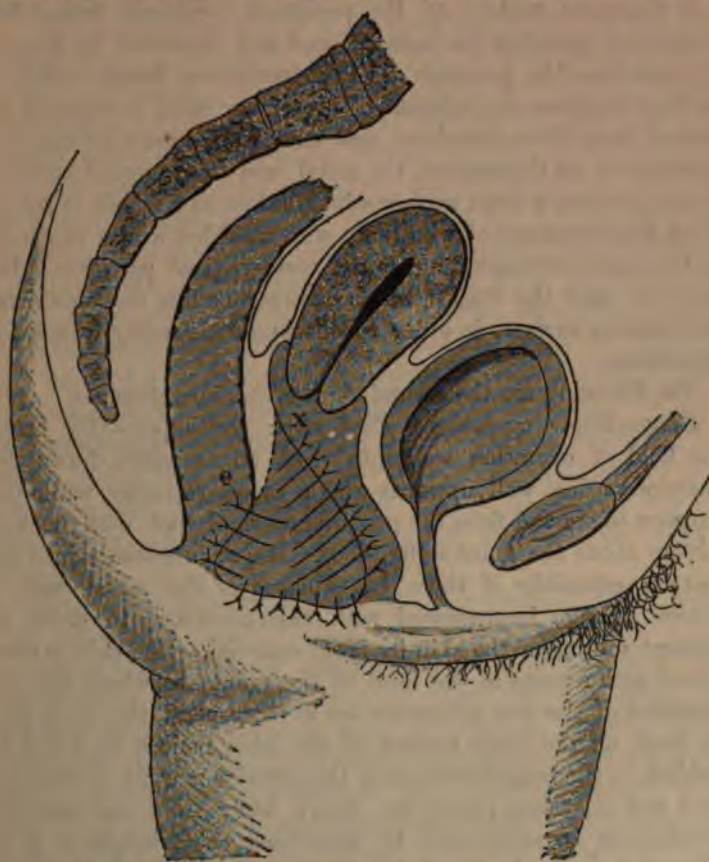


Fig. 440.—Complete rupture of the perinæum. Perinæorrhaphy. Simon-Hegar operation. General arrangement of stitches.

may be taken out, and on the fourteenth the deep ones. The patient may then leave her bed.

Martin * has introduced a modification in the suture which I

* A. Martin. Ueber die Lappen-Dammoperation (Berl. klin. Woch., 1889, No. 6, p. 108).—See on this subject the discussion at the Berlin Obstet. and Gyn. Soc., Jan. 11, 1889 (Centr. f. Gyn., 1889, No. 9, p. 144, and foll.).—Riedinger (Wien. klin. Woch., 1888, No. 26, p. 531) had also used the continuous suture.—C. Olrik (Hosp. Tid., 1888, vol. 6, p. 873) inserts silk stitches in superposed layers.

think is a great improvement. Instead of using silver wire and interrupted sutures he uses catgut prepared with essence of juniper and continuous suture in superposed layers. The operation is thus made very rapid and apposition is perfect.

2. *Complete rupture of the perinæum.*—Simon's triangular freshening operation has been adopted and improved by Hegar. It starts from the principle that the perinæum being ruptured on three surfaces, the solution of continuity must be repaired in each of these three directions, and that stitches must be inserted successively on the vaginal, the rectal, and the external surface. Hegar freshens a large surface which, taken as a whole, is something like the shape of a butterfly with unfolded wings, the body of the insect corresponding to the recto-vaginal partition. He does not split the tissues, but he simply excises the cicatricial and mucous surfaces in order to obtain a satisfactory wound for apposition.

The following are the several steps of his operation:—

Simon-Hegar operation.—*First step: freshening.*—To bring the field of operation well into view, an assistant draws the anterior vaginal wall upwards with a broad retractor, while the surgeon seizes and fixes the posterior vaginal wall with hooked forceps above the point *x* (fig. 438). Hegar introduces into the rectum, especially if there be prolapse of the rectal wall, a conical sponge impregnated with chlorine-water, in order to prevent soiling of the skin by faecal material. The skin is then seized with forceps at the level of the points to which the extremities of the new perinæum are to correspond, that is to say, in front, on the inner surface of the labia majora at *a* and *b*; behind, in the neighbourhood of the anterior margin of the anus at *c* and *d*; these points are drawn away from one another. Freshening is commenced by describing the triangle *n, x, n*. The point *x* must be situated in the median line of the posterior vaginal wall and be about 2 cm. distant from the point *e*, which represents the extremity of the triangular freshening of the wall of the rectum. By excising this small triangle of mucous membrane with the apex directed towards the vaginal cul-de-sac the disadvantage of seeing the extremity of the lips of the wound project upwards when the stitches are tied is avoided, and the sliding of the freshened lateral portions towards the middle line is greatly facilitated. Moreover, by acting thus

greater solidity is given to the recto-vaginal septum that is about to be formed, for the points *x* and *e*, which represent on the vagina and the rectum the summits of the freshened surfaces, will be further distant from one another than if *x* were situated at the middle of a straight line uniting the points *n* and *n*. Lastly, firmness of union is made more certain, and the formation of recto-vaginal fistulæ at *e* is much better avoided.

Starting from *n*, *n*, and proceeding in an upward and outward direction, a curved incision, convex forwards, is traced out; it should extend on each side to the points *a* and *b*, which, when brought together, will constitute the fourchette of the new perinæum. These points are situated on the lower part of the internal edge of the labia majora. Thence the incisions *a*, *c* and *b*, *d* are made; they should be from 3 to 4 cm. in length, and when joined will form the raphé of the new perinæum. These incisions must be directed well downwards, and must converge to a point at which the anus will later be situated. The incision is then bent inwards to trace out the lines *c*, *e* and *e*, *d*; these last incisions should be made, by preference, with scissors. The edges of the flap thus traced out are isolated by pushing in a knife on the flat for a depth of from 2 to 3 mm., and the freshening is completed by dissecting off the strip thus circumscribed.

At the sides some venous plexuses of importance exist, which are sometimes wounded, and free hæmorrhage occurs; the bleeding points may be compressed with pledgets of cotton-wool, and if necessary they may be seized for an instant with forcipressure forceps. It is rarely necessary to tie any vessels. After having applied forcipressure forceps, care must be taken, before drawing the sutures tight and fastening them, to resect the portions of tissue which had been seized and compressed between the blades of the forceps; it is afterwards only necessary to bring the edges of the wound into thorough apposition for the hæmorrhage to cease of itself.

Hegar makes the judicious remark that in their first operations of this kind surgeons generally commit the fault of freshening far too great an extent of surface. This uselessly increases the extent of the traumatism and augments the difficulty of bringing the surfaces together, for a considerable amount of tension must be put upon the tissues to bring the lateral portions of the

freshened surface into apposition. It is just as useless to carry the points *c* and *d* too far forward. Another mistake must not be made in tracing out the freshening in such a way that the points *d* and *c* are too far outwards. If this be done, great difficulty will be found in bringing the lines *e, d* and *e, c* into apposition (fig. 438).

When the rupture is not deep the freshened surface will be shaped like the wings of a butterfly, the small triangle *n, x, n* representing the head of the insect. If it affect a large portion of the recto-vaginal septum, the freshening will be modified and will rise up on each lip of the division of the recto-vaginal septum.

Second step: suture. When the wound has been properly trimmed, the surgeon begins to stitch up the edges of the triangle *n, x, n* (fig. 439). Hegar uses for this purpose curved needles mounted on a needle-carrier and threaded with silver wire. The needle is thrust into the mucous membrane 3 mm. from the edge of the wound, and directing its extremity on the flat beneath the raw surface it is brought out 3 mm. on the outer side of the opposite edge. If the triangle *n, x, n* is very broad, too great a mass of tissue must not be included, and the suture must not pass beneath the whole extent of the wound, but should remain free for a certain length in the middle of it. By acting thus better apposition of the two freshened lips will be obtained.

As soon as the vaginal stitches have been inserted, a few should be inserted from the rectum. Starting from the rectal side a needle must be thrust in from 2 to 3 mm. from the edge of the wound and directed from below upwards; the needle after having traversed a certain extent of the wound is to be drawn out, seized afresh with the needle-carrier, and thrust into the wound on the opposite side at a point exactly corresponding to that from which it has just been brought out; it must then be directed from the wound towards the skin, that is to say, downwards and outwards. The ends of the suture thus passed will hang in the rectum. Instead of giving the needle the direction that I have just described, a needle may be placed on each end of the suture, and each needle may be passed from above downwards, and within outwards, on each lateral portion of the wound. It is very difficult to remove metal sutures that have been applied in the rectum and cut short; moreover they are a great source

of discomfort to the patient. Hegar now uses catgut or very fine silk for the rectal stitches, and abandons them entirely.

For fastening the sutures either of two methods may be followed :—

1. Pass first all the sutures, and tie them afterwards as Hildebrandt did, as we shall see later on.

2. First pass the deepest suture, draw it tight, fasten it, and then see what is the result; pass a second suture embracing a greater amount of tissue, tighten it, and fasten it; continue thus, gradually levelling the lips of the wound, modifying the arrangement of the sutures, and correcting the shape of the freshening as is necessary. This is the method which Hegar adopted.

As soon as the rectal and vaginal sutures are applied and tied, the surgeon proceeds to insert the perineal stitches (fig. 440). Here ordinary rules are to be followed. While sutures are being tied care must be taken to adduct the patient's thighs, so as to diminish the tension of the tissues. During this whole stage of the operation it is advisable to have the patient placed in the dorso-sacral position.

How is it advisable to arrange the superficial and the deep sutures? Dieffenbach only placed deep sutures on the perinaeum, but, on the other hand, Simon attached the greatest importance to the sutures that are applied in the rectum and vagina. Later, Simon regarded it as a great advantage to insert some very deep sutures on the rectal side, and only moderately deep sutures on the vaginal side. Hegar prefers to insert deep stitches into the vaginal and rectal walls to placing them in the perinaeum, although he does not reserve them exclusively for the two former situations. The essential point, he says, is not to leave the slightest space where the walls are not exactly in apposition with one another, and in which any liquid may accumulate. When the rupture is very deep Hegar modifies his usual method. If the laceration reach up into the rectum for a distance of more than 4 cm., the freshened surfaces on the recto-vaginal septum are so narrow that a single series of stitches only is necessary, and they may be tied on the vaginal side, and will embrace the whole thickness of the septum; and if the surgeon wished to insert two series of sutures, one on the rectal and the other on the vaginal side, the sutures would not

include a sufficient thickness of tissue. On the other hand, it might be feared that by having only one series of stitches apposition would not be regular; but that may easily be avoided by making deep stitches embracing the whole of the thickness of the septum, alternate with superficial stitches that only include the vaginal wall. When one comes lower, to the perinæum, where the freshened surfaces are more extensive, the triple series of sutures described above is put in. Lastly, when the solution of continuity is very great, the operation may be completed in several stages. At first a certain extent would be freshened and stitched up, then another segment of the rupture would be freshened and afterwards stitched, and so on. By adopting this course serious loss of blood will be avoided, and a large wound will not be exposed for too long to the action of the air.

Once the insertion of the stitches has been completed, care must be taken to express with the fingers any blood which may have been retained between the edges of the wound, and the vagina, rectum, and perinæum must be carefully cleansed with some antiseptic. Hegar then divides, subcutaneously or through the skin, the sphincter ani by making two lateral incisions on the posterior margin of the anus. This operation often leads to somewhat severe hæmorrhage, which, however, can be easily controlled by ligature or forcipressure. Division of the sphincter, according to Hegar, presents some advantages, for it prevents traction upon the rectal sutures, and during the first few days it facilitates the free exit of fecal material and flatus, which not accumulating in the rectum do not distend the walls of this canal, and in consequence are not an obstacle in the way of union. Baker Brown used also to divide the sphincter subcutaneously, but further back towards the coccyx. Of late years Hegar has not resorted to the lateral liberating incisions, of Dieffenbach which at first he used to make. These incisions parallel to the line of junction of the freshened edges and a third longer than it, were situated about an inch from it on each side, and passed beyond it above and below. They penetrated right into the subcutaneous adipose tissue. These incisions, however, become useless when the surgeon has taken care not to exaggerate the size of the freshened surface on the labia, for then there is no great tension on the tissues. More-

over, the presence of two open wounds in the neighbourhood is not altogether an advantage, for they are absolutely ready to receive infection.

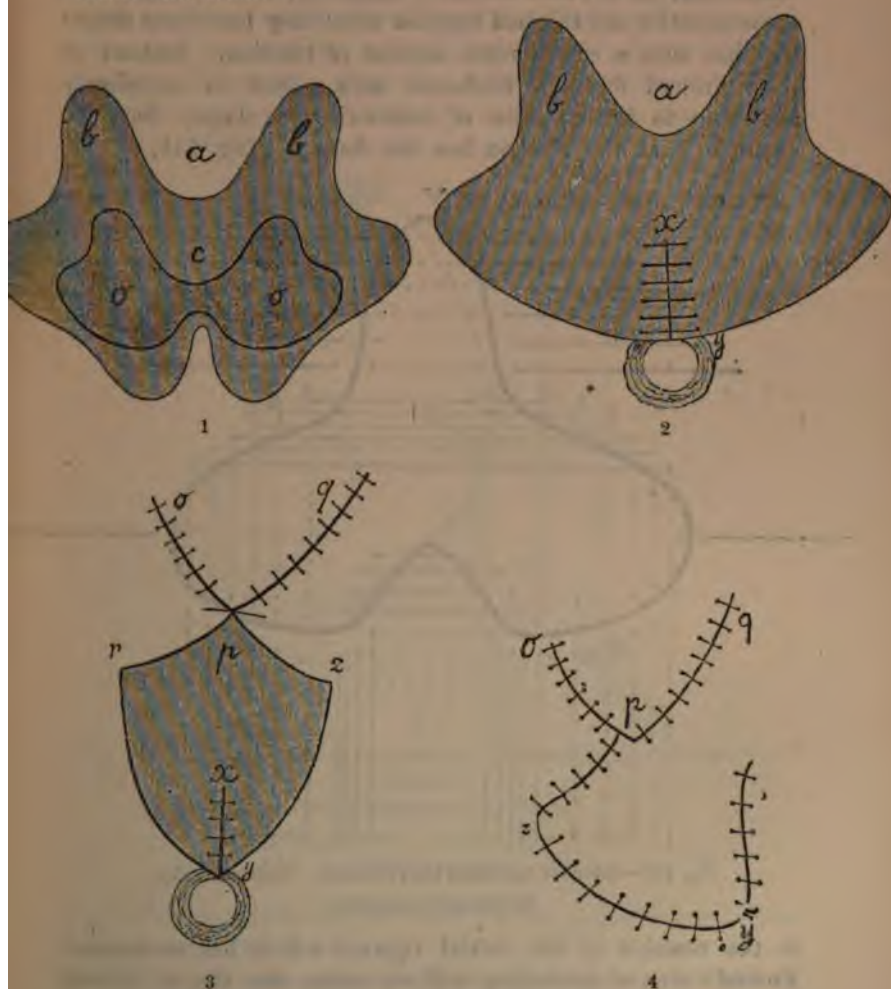


Fig. 441.—Complete rupture of the perinæum. Perineorrhaphy.

Freund's operation.

Freund's operation.—Freund has quite specially insisted upon the necessity of making the freshened surface in such a way that the surgeon reproduces the condition in which the

perinæum was immediately after the rupture occurred. If the ordinary methods, he says, be followed in making the freshening, parts which normally ought not to be brought into approximation are stitched together after they have been drawn together with a considerable amount of traction. Instead of that, Freund forms a freshened area which is completely analogous to the solution of continuity in shape. Say, for example, that the cicatrix has the form *o, o* (fig. 441, 1). It

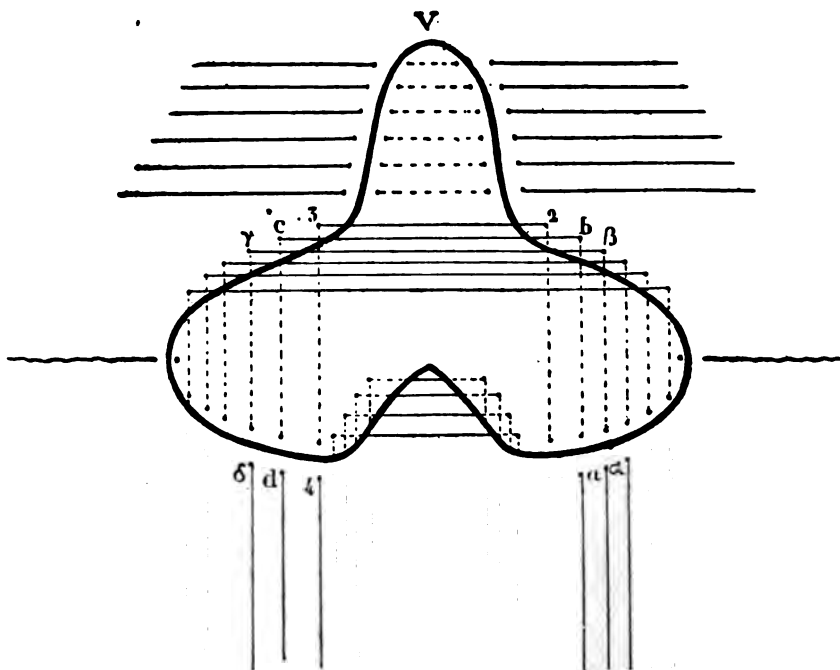


Fig. 442—Complete rupture of the perinæum. Perinæorrhaphy.
Hildebrandt's operation.

is the remains of the initial rupture which has contracted. Freund's area of freshening will reproduce this shape. It will be represented by the line *b, a, b*. Freund therefore incises the posterior vaginal column a certain distance from its extremity; on the sides of this column he carries the knife backwards and upwards towards the points *b, b* (fig. 441, 2) in such a way as to circumscribe the cicatrices situated on the vagina and the labia majora; he completes the freshening in the usual way: 1. He

inserts stitches along the line s, x (fig. 441, 3), which corresponds to the rectum; 2. He unites each edge of the posterior vaginal column with the external edge of the surface of freshening that he has traced out on the lateral portions of the posterior vaginal wall. The raw surfaces o, p and q, p (fig. 441, 3) are stitched together. It now only remains to stitch together the lips of the wound p, r , and p, z , which when united will form the internal

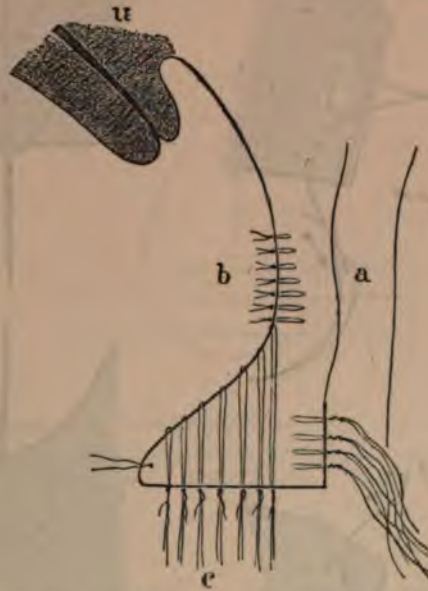


Fig. 443.—Complete rupture of the perinæum. Perinæorrhaphy. Hildebrandt's operation.

General arrangement of stitches.

u , uterus; a , rectum; b , vagina; c , perinæum.
(Vertical section).

portion of the vulva, and the lines r, y and z, y which will form the perinæum (fig. 441, 4).

Hildebrandt's operation.—Hildebrandt traces out a freshened surface which is similar in shape to a clover leaf, and, at any rate for a part of the freshened surface, he performs the perinæorrhaphy with sutures tied on one side only. First of all he places the vaginal and then the rectal sutures. But over the whole remaining portion of the perinæo-vaginal wound he only inserts very deep stitches which he ties on the perinæum.

According to him, by this method the surgeon avoids the possibility of the formation of a large space between the rectal, vaginal, and perineal surfaces in which blood might collect, and

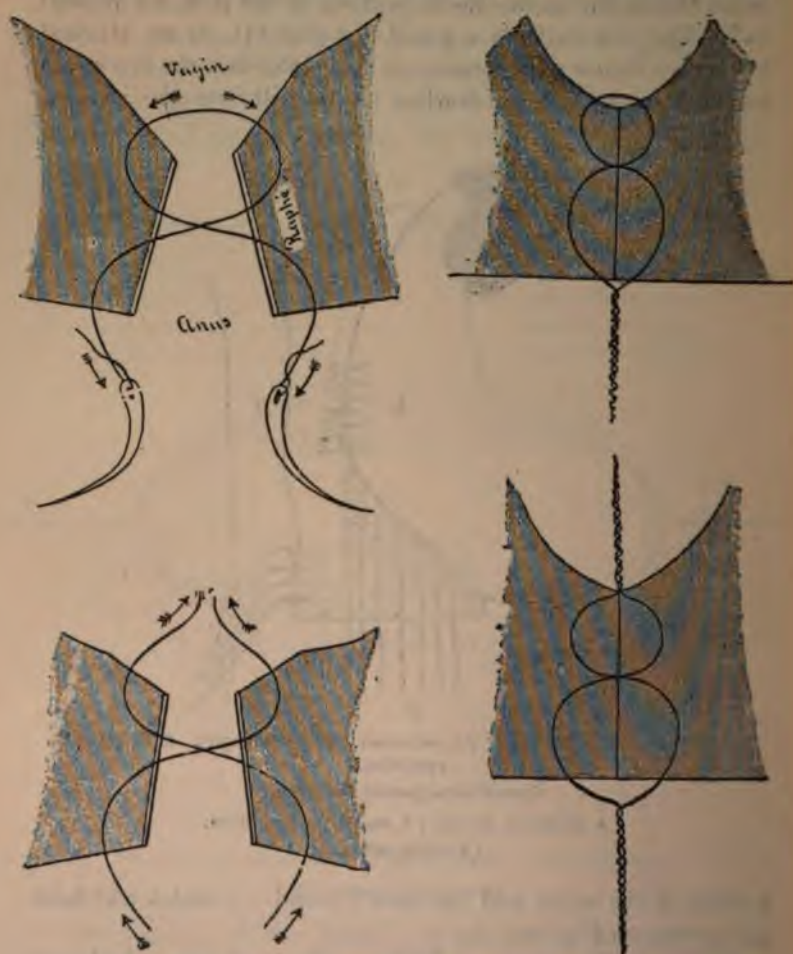


Fig. 444.—Suture in perineorrhaphy. Heppner's method.

which afterwards might become the seat of abscess (figs. 442 and 443).

Heppner's operation (suture).—Heppner followed the same indications when he proposed the figure of 8 suture. This suture should at the same time ensure union on the vaginal and

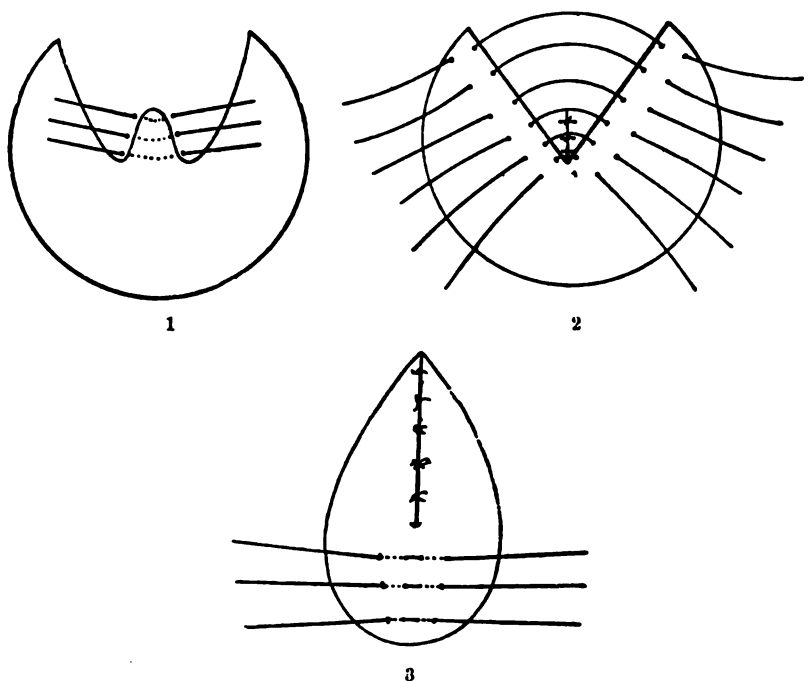


Fig. 445.—Incomplete rupture of the perineum. Suture by Lauenstein's method.

1. Suture of the anterior angle of freshening by the usual method.
2. Sub-mucous suture of the vaginal wall.
3. Hidden sutures in the depth of the wound.

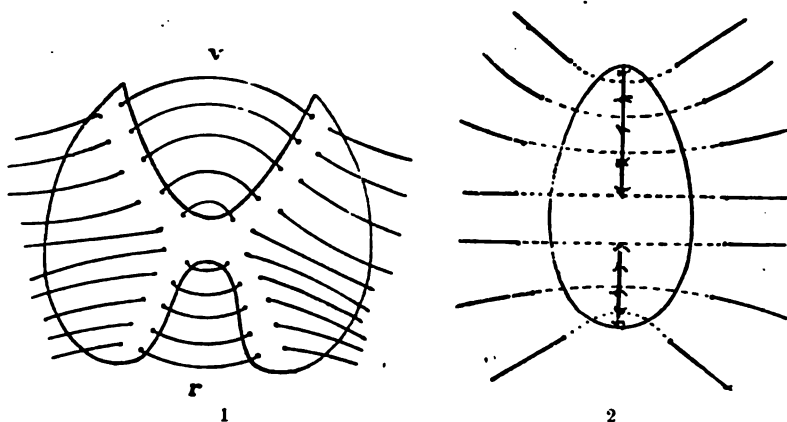


Fig. 446.—Complete rupture of the perineum. Suture by Lauenstein's method.

1. Introduction of the sutures bringing the vaginal and rectal mucous membranes into apposition.
2. Introduction of the perineal stitches after the rectal and vaginal stitches have been tied.

on the perineal surface. This is his mode of procedure: he enters his needle threaded upon each end; he thrusts each of these needles into the lip of the vaginal wound, brings it out at the middle of the wound and thrusts it into the opposite wound at the same time crossing it with the other needle. He then forms a figure of 8, of which one loop is situated on the vaginal side, and the other loop, closed by the knot, embraces the perineum (Fig. 447).

*Lauenstein's operation (entire).**—This method of sub-mucous



Fig. 447.—Complete rupture of the perineum. Perineorrhaphy. A. Martin's operation.

a, deepest stage of the continuous suture; *b*, passage from the deep to a second and more superficial layer.

suture has for its object the prevention of infection of the track of the stitches by the vaginal and rectal secretions; for this infection is most likely to occur when the stitches are made to penetrate into these cavities, as in the usual method of insertion.† Lauenstein inserts the sutures half a centimetre from

* C. Lauenstein. Die Vermeidung der Stichcanäle in Scheide und Mastdarm bei der Plastik des Septum recto-vaginale (Centr. f. Gyn., 1886, No. 4, p. 48).

† The danger of infection of sutures that penetrate into the natural cavities had been clearly pointed out by P. Krasko. Ueber einen üblen Zufall nach der Gastrotomie (Centr. f. Chir., 1881, No. 5, p. 33).

the edges of the wound on the raw surface, and makes hidden and interrupted catgut sutures after the manner suggested by Werth.* When the rectal and vaginal mucous membranes have thus been brought into apposition, Lauenstein further diminishes the depth of the wound behind by a few hidden sutures; then he stitches up the perinæum with silver wire.

In complete rupture the anterior angle of freshening of the septum, according to the Simon-Hegar method, must first be

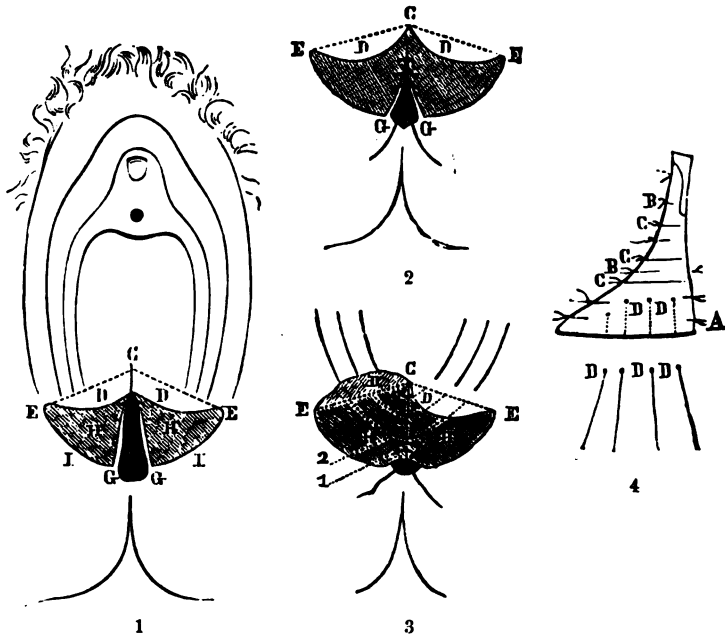


Fig. 448.—Complete rupture of the perinæum. L. Le Fort's operation.

1. The lines of incision. 2. Reconstitution of the rectal wall, track of the stitches.
3. Reconstitution of the vaginal wall. 4. Position of all the stitches seen on vertical section.

stitched up by sutures inserted in the usual manner (figs. 445 and 446).

A. Martin's method of suture.—Martin freshens a similar area to Simon, but uses for suture a very expeditious method, which absolutely does away with any danger of lack of coaptation of the tissues, for which Hildebrandt and Heppner invented their

* Werth. Centr. f. Gyn., 1879, No. 28, p. 561.

ingenious but complicated methods of suture. He makes a continuous catgut suture in superposed layers. He commences, as for colporrhaphy, with the upper angle of the wound, and first closes the rectum by stitches which start from the intestinal mucous membrane, penetrate into the raw surface, and come out again into the rectum. The intestinal rent once closed down to the anus with the same suture, but proceeding in the opposite direction, he puts in the first layer of sutures in the wound itself; this layer rises upwards and comes into the vagina at the upper angle from which the suture first started. If this single layer be sufficient he thus unites the edges of the vaginal wound first, and then those of the perinæum. If the raw surfaces, however, be too extensive he puts in a second layer of stitches before proceeding to the final occlusion (fig. 447).

L. Le Fort's method.—Le Fort's* method in many points is similar to that of Demarquay, from which it is derived, but differs by a certain number of ingenious modifications. It is applicable to complete ruptures that involve a considerable extent of the septum. After having drawn the edges of the vulva apart on the median portion of the intact septum and starting from the angle of its remains, at the point *C* (fig. 448, 1) an incision is made 1 cm. in length, which involves no more than the vaginal portion, that is to say, half its thickness; then an incision, slightly convex below, is made in the direction of the line *C, D, E*, rising up to the point *E*. From the same starting-point, *C*, a second incision, *C, G*, is made running along the rectal portion of the remains of the septum, but not implicating the rectal mucous membrane, and reaching right down to the sides of the anus. These two incisions, inclined to one another at an acute angle, are united by a third curved incision *E, I, G*, and form a triangle *H*, over the area of which the skin and cicatricial tissue are removed so as to have a freshened triangular surface on each side. This done, seizing the vaginal half of the septum and the anterior edge of the incision *C, D, E*, with hooked forceps, it is split by dissection up to the punctate line *C, E*, whereby a small vaginal flap *D* is formed, which will join by apposition of its

* Le Fort (Malgaigne's manual of operative medicine, 9th edit., vol 2, p. 716) put his method into practice for the first time on Nov. 26, 1868, and published it March 2, 1869, several days, he says, before Richet's similar operation.—Demarquay's operation dates from 1858.

deep raw surface with the corresponding flap of the other side. The sutures now only remain. As far as the septum is concerned there are three layers of sutures: one, rectal, formed by suture of the two edges of the rectum: a second, vaginal, formed by suture of the two small flaps *D*; a third and large intermediate layer formed by the apposition of the two freshened triangles *H*.

For the reconstitution of the rectal portion interrupted stitches, beginning below the spur *C*, are inserted all along the incisions *C, G*, that run along the rectum down to the anus. For this purpose the needle is introduced along the left border and drawn from the rectum towards the vagina, and then in the right lip of the incision (fig. 448, 2) from the vagina towards the rectum. This first stitch being tied, a second is placed in the same way, and then a third, and even a fourth, until the anterior rectal wall has been reconstituted down to the anus. This stage of the operation completed, the rectum is, by a thin layer it is true, re-formed, and completely shut off from the vagina. This done, the surgeon proceeds to repair the intermediate portion of the septum in order to approximate the raw triangular surfaces *H*, in the portion which will correspond to the septum. A first suture (fig. 448, 3) is inserted beyond the line *C, E*, along which the base of the small vaginal flap is adherent. It is passed from above downwards, and from right to left, in the substance of the freshened soft parts at the level of the triangle *H*, re-appears at the middle line, ascends from below upwards, and at the same depth in the left lip of the wound, to come out again half a centimetre from the line *C, E*. Three or four sutures are inserted in the same way at the spot which will re-form the most distant portion of the septum. During all this stage, the left index finger placed in the rectum guides the needle, and ascertains that it does not penetrate into the intestine. These sutures are introduced, but not tied; they will not be tied until after the introduction of the sutures that are to reconstitute the perinæum and the sphincter. Two or three of these sutures are inserted according to the height of the perinæum. The needle enters one or one and a half centimetres from the perinæal edge of the freshened triangle *H*. A first silver suture introduced at the point *E* (fig. 448, 3) penetrates to the level of the spur, and is brought out at the corresponding point on the opposite buttock.

A second suture is inserted less deeply and fairly close to the rectal mucous membrane; it does not go as far as the partition, and is destined to support the reconstituted sphincter. If necessary, a third suture is placed between the other two. The ends of these three sutures are separately fixed on each side in the end of a gum-elastic bougie pierced with holes, and they are kept in position by means of Galli's tubes. These sutures exert traction upon the deeper portions of the freshened surfaces, and tend to approximate the vagino-rectal septum and the surface of the perinæum. Before applying the bougies and tightening these sutures, the vaginal sutures are tightened and kept in position by means of Galli's tubes, and, as they are gradually drawn tighter, a few superficial stitches are inserted to join the small vaginal flaps *D, D*, to one another.

Le Fort unites the portion which is destined to re-form the septum by transverse vaginal sutures (*C, C, C*, fig. 448, 4) reaching nearly as deep as the rectal mucous membrane. Between them are the superficial stitches *B, B*, that join the small vaginal flaps *D* together (fig. 448, 2, 3). The transversely placed perinæal sutures (they were inserted from before backwards, *D, D, D*, fig. 448, 4) only penetrate for a depth of about one centimetre; as a rule, there are three of them. The first penetrates to the point *E* (fig. 448, 3), one centimetre outside the base of the triangle of freshening; the second is intermediate; the third is very close to the rectal mucous membrane, and principally serves to reconstitute the sphincter. The operation is terminated, if necessary, by making Dieffenbach's liberating incisions, which have the double advantage, according to Le Fort, of lessening the traction in the transverse direction, and of allowing the whole sutured portion to ascend towards the spur of the septum.

Richet's operation.—This operation, like the preceding, is derived from that of Demarquay. Nevertheless it presents several original peculiarities. It has been described extremely well by Picqué,* from whom I borrow the description.

In the first stage the surgeon makes a curvilinear incision which circumscribes the recto-vaginal cleft a short distance from its free border. This incision, which only includes the vaginal wall, will allow of splitting of the septum. The incision is

* Picqué. *Internat. Encycl. of Surg.*, French edit., vol. 7, p. 753.

prolonged on each side down to the level of the cicatricial surfaces that result from the laceration of the perinæal body; here a butterfly-shaped surface is freshened, the posterior portion of which is prolonged somewhat backwards. The incision and freshening once made, Richet splits the recto-vaginal septum; the splitting, insignificant at the most distant point from the recto-vaginal cleft, increases gradually in extent as the large freshened surface is approached, but even at the point of junction it does not exceed 8 to 10 millimetres; under these conditions, when the two portions of the divided perinæal body are afterwards brought together, the two vaginal lips of the horizontal cleft will glide over the rectal wall to come back to back in the middle line; each of the points of these two lips will describe an arc of a circle around the bounding point of the cleft, which will be greater the nearer it is to the perinæum. One can, therefore, understand that the posterior point serving, so to speak, as a pivot, and remaining motionless, the splitting is valueless at this point.

In the second stage he approximates the edges of the vaginal flaps, and applies their raw surfaces to one another by means of a few interrupted stitches. The hindermost stitch is first inserted, and it is this one which would be most difficult to place if the perinæum were first re-formed, and it is this one which, since it passes through a portion of the lip which is only of small extent, may easily be inserted before the perinæal sutures are tied. It is intelligible that the same holds good for the subsequent stitches. The anterior stitches, on the other hand, ought not to be put in until the perinæal stitches have been tied, except in cases where the cleft is only of moderate depth. The adhesion of the lips of the solution of continuity by their raw surfaces gives rise to the formation of a projecting median crest. The third stage consists in the re-establishment of the perinæum by the apposition of the lateral raw surfaces, by means of three or four interlacing stitches, placed deeply, so as to make the surface of apposition as large as possible. Richet thinks that interlacing suture makes coaptation more certain; to avoid ulceration at the point where adjacent stitches interlace, he uses the ends of fairly soft gum bougies, which he separates from the skin by the interposition of a small quantity of carbolic or iodoform gauze; each stitch is thus rendered independent of the

others. The stitches once placed in the vagina, he completes the perineal suture, and, if necessary, inserts a few superficial stitches on the perinæum between the deep stitches.

It is seen that this operation only comprises two lines of stitches, which are exactly perpendicular to one another. Richet does not put any stitches at all in the rectum.*

Emmet's operation.—Described by its originator in a very diffuse manner, this operation became known in France particularly through Jude Hûe's description, which brought well into relief the original points in the method to which it owed its great success. The description that he gave and the accompanying diagram, reproduced afterwards by several writers,† do not, however, appear to correspond exactly with the original operation of the inventor, notably as regards the anterior portion of the freshening and suture. It is not true, moreover, to say, as has incessantly been repeated, that a long curved needle mounted on a handle is indispensable; Emmet only uses an ordinary needle,‡ which he introduces up to the summit of the freshened surface, where he brings it out and introduces it again at the same opening. With these exceptions, I shall borrow Kirrison's very excellent description of the operation. (The woodcuts that I reproduce are taken from a paper by Hanks,§ one of Emmet's pupils.) The patient being anæsthetised and placed in the lithotomy position at the edge of the bed, two assistants support the lower limbs on each side. The operator, after having carefully washed the anal region, the perinæum, and

* Close beside Le Fort's and Richet's operations may be placed those of Marc Sée and Polaillon. Bull. et Mém. de la Soc. de chir., 1885, p. 242. They only differ from them in some very interesting details. Terrillon's operation (Ann. de Gyn., 1879, vol. 11, p. 330, and Bull. et Mém. de la Soc. de chir., April 15, 1885, p. 228) closely resembles Emmet's operation in its mode of suture. But it has not the benefit of the "purse" suture like the latter; Terrillon puts in a first row of interlacing sutures, like Roux, and a second deep row over a plate of lead, like Trélat.

† Jude Hûe. Bull. et Mém. Soc. de chir., 1886, p. 710.—Kirrison. Art. Perineorrhaphy in the Ency. Dict. of Med. Science, 1886, p. 114.—Picqué, *loc. cit.*

‡ Le Fort (Malgaigne's manual of oper. med., 9th edit., vol. 2, p. 726) has thoroughly removed the mistake. But I am obliged to maintain, contrary to him, that Emmet's operation is really a single row of sutures for complete rupture of the perinæum. It is only in those very exceptional cases in which the laceration extends very high up on the recto-vaginal septum that he freshens it anteriorly, and sutures it on the vaginal side by what is really a supplementary operation, which does not in the least alter the fundamental principle of his operation for perineorrhaphy.

§ H. T. Hanks. Med. Rec., New York, July 1, 1882, vol. 22, p. 1.—This paper has also been used by Mundé. Minor Surgical Gynæcology, 1885, p. 501.

the vagina with some antiseptic liquid, proceeds to the freshening, which is to be made upon the same principles as in any other operation for perinæorrhaphy. In a word, it ought to be extensive. On each side of the ruptured perinæum it represents a triangle of which the base is the skin, one of the sides follows the vaginal wall, and ascends up to the lower fourth of the labium majus, while the other, passing in front of the anterior margin of the anal orifice, joins the cutaneous incision. These

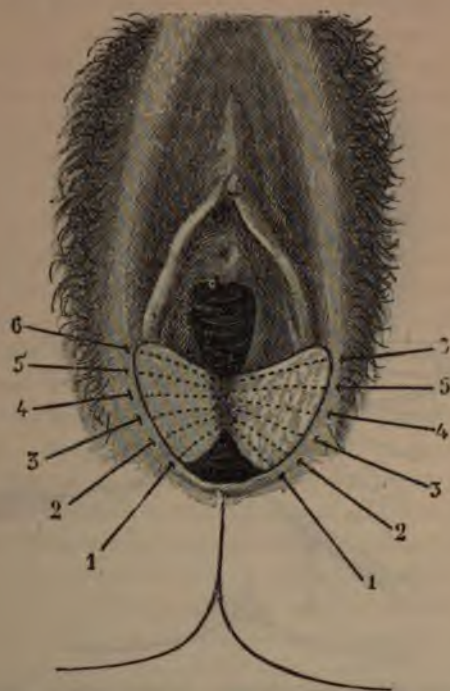


Fig. 449.—Complete rupture of the perinæum. Perinæorrhaphy. Emmet's operation
Freshening and arrangement of the stitches.

two triangles are united to one another in the middle line by an area of freshening formed at the expense of the lower portion of the recto-vaginal septum, and rising upwards for a height of 3 centimetres. The shape resulting from this freshening may be very fairly likened to that of a butterfly with unfolded wings; the median freshening represents the body of the insect, and the two lateral freshened surfaces its wings (fig. 449).

To ensure regularity of the freshened surfaces, which must correspond exactly with one another at all points once apposition is made, it is advisable first to trace out their boundaries with the point of a knife. Another very useful precaution is to begin by freshening the median portion. In point of fact, if the surgeon proceed otherwise he will be inconvenienced by the blood coming from the lateral freshened surfaces. Jude Hübner very wisely remarks that however careful the surgeon may be to

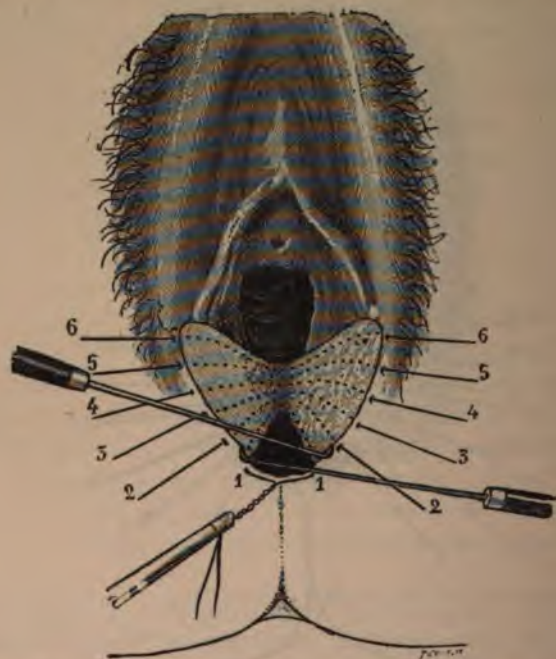


Fig. 450.—Complete rupture of the perineum. Perineorrhaphy. Emmet's operation. Tightening of the posterior "sub-sphincterian" suture.

freshen as superficially as possible, the freshened septum always bleeds profusely. This is an additional reason for commencing with the middle portion, because while one is proceeding to freshen the lateral surfaces, time will be given for the bleeding to stop. The finger of an assistant introduced into the rectum puts the recto-vaginal septum on the stretch, and makes it project forward, which renders freshening of the middle portion much easier. During freshening of the lateral surfaces it is also

necessary for the parts upon which the knife has to be brought to bear to be gently drawn outwards by an assistant. Once freshening is finished the field of operation must be cleared of blood, and all bleeding must be arrested; for this purpose, in the vagina, in the rectum, and over the freshened surfaces themselves, cold irrigation of some antiseptic fluid is carried out (boracic acid, carbolic acid solution, or weak corrosive sublimate solution may be used). Then the surgeon proceeds to insert the stitches, and this is the most special stage in perinæorrhaphy by Emmet's operation. This suture may be carried out in a single stage with a needle having a considerable curvature and mounted on a handle, the stem of which represents a little more than a semi-circle (fig. 18, 1), or simply with a very large Hagedorn needle, firmly held by my needle-carrier (fig. 21, and fig. 22, 3). Moderately thick silver wire is always used for the sutures, which are to be inserted from behind, forwards. For this purpose the surgeon engages the point of the needle, which is held in the right hand, in the left side of the perinæum, about one and a half centimetres behind and to the outer side of the posterior margin of the anus; he makes the needle course beneath the lower portion of the recto-vaginal septum, and brings it out on the right side of the anus at a point corresponding to its point of entrance. If there be a great thickness of tissues to traverse it is more convenient to pass the stitch in two stages, first of all thrusting a moderately curved needle up to the septum, drawing it out, and then introducing it afresh at the exact spot from which it has just made its exit. During the whole of this stage introduction of the left index-finger into the rectum is absolutely indispensable; it keeps the recto-vaginal septum on the stretch, guides the passage of the needle in its substance, and prevents it from entering into the rectum. This small manœuvre of passing the suture needs to be carried out with much care and no hurry, in order that the needle may not pierce the rectal wall, may not be lost in the deeper parts, and may be brought out through the skin at a point exactly opposite to its point of entrance. Four or five other sutures are afterwards inserted in the same fashion above the first. Introduced 1 cm. outside the limit of freshening, they also course across the recto-vaginal septum, about half a centimetre one above the other, and come out on the opposite side of the perinæum.

It is essential to pass the first suture properly; its object is to unite the two divided ends of the sphincter, and to re-establish as far as possible the anus in its first condition of integrity; it must course beneath the raw surface very close to its posterior border, but including thoroughly the angle of division of the septum, from which it has to take a firm support. Generally five or six sutures are sufficient to ensure the complete restoration of the perinæum; but if the region of the fourchette be not sufficiently brought into apposition a superficial stitch at this spot will be necessary. Similarly, if the cutaneous edges of the perinæal incision are not everywhere brought into perfect contact by the deep stitches a few supplementary stitches will be put in superficially. The operation is terminated by yet another careful cleansing of all the parts, after which the dressings may be applied.

As is seen from the foregoing description, Emmet's operation for complete rupture, except for the rare cases in which the recto-vaginal septum is lacerated very high, comes into the category of operations with a simple row of stitches; for here we have no separate rectal and no separate vaginal sutures; all the stitches are inserted in one direction from the skin across the recto-vaginal septum or the vaginal wall. It is therefore a very great simplification of the operation. But this, however, is not its primary object. According to Emmet and Gaillard Thomas the reason for placing the posterior stitch behind the anus and making it cross the recto-vaginal septum is to draw forward the two divided extremities of the sphincter, which the retraction has carried backwards, and to bring them into contact in such a way as to re-establish the integrity of the ring represented by the anal sphincter, and to restore to it at the same time its shape and its function. Be that as it may, the application of this posterior stitch needs careful watching; when the operation is ended the surgeon must always insert his finger into the rectum to make sure that the intestinal canal is not too much constricted by the stitch, as then there would be considerable danger from not leaving an easy exit for flatus and faecal material.

A great advantage of Emmet's operation is that it closes, by traversing the recto-vaginal wall, the solution of continuity by a circular constriction, just as a purse is closed by drawing upon

the cords. At the same time the recto-vaginal septum is drawn downwards, which, as a rule, allows its separate suture to be dispensed with. And thus is realised on the vaginal side the exact occlusion and the protection of the line of stitches that Langenbeck sought to obtain by the formation of his autoplasmic flap. Lastly, the absence of stitches in the rectum considerably lessens the chance of infection.

If a very high division of the septum render its suture necessary, Emmet takes care to freshen only the vaginal surface of this laceration and to pass his stitches beneath the whole extent of the raw surface, avoiding the intestinal canal. He fixes them by means of shot in the interior of the vagina (fig. 451). But this kind of supplementary operation is only very rarely

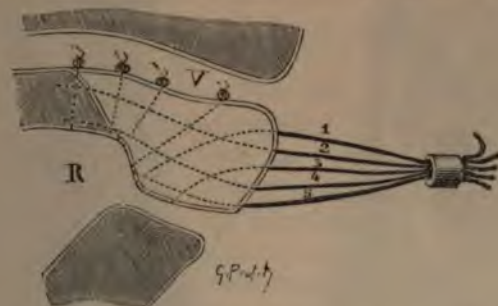


Fig. 451.—Complete rupture of the perinæum and recto-vaginal septum.
Perinæorrhaphy.

Emmet's operation; suture complete (vertical section).

necessary, and the typical operation still remains the one with single perinæal suture.

Lawson Tail's operation.—This operation differs little from that designed for incomplete rupture which I have described above. Here also the surgeon begins by splitting the recto-vaginal septum so as to convert it into a rectal and a vaginal flap. The more extensive the rupture, the deeper should the freshened surface reach. According to Säger this flap-splitting is here better carried out with the knife than with the scissors. It is carried laterally to the vertical lines passing to the junction of the labia majora and minora. To these lines, sufficient in cases of incomplete rupture of the perinæum, must be added a posterior incision which makes of the whole incision a letter H,

of which the crosspiece, instead of being at the centre, is nearer to the lower than to the upper part of the letter (fig. 452). The splitting may be commenced with the knife or even with scissors. Then the vaginal flap of the septum is carried upwards and the rectal flap downwards in order carefully to free with the scissors the lateral mucous surfaces comprised between the angles of the lines of section.

The two flaps resulting from splitting of the recto-vaginal septum, when one is drawn upwards and the other downwards, present a quadrilateral surface, at the bottom of which is the

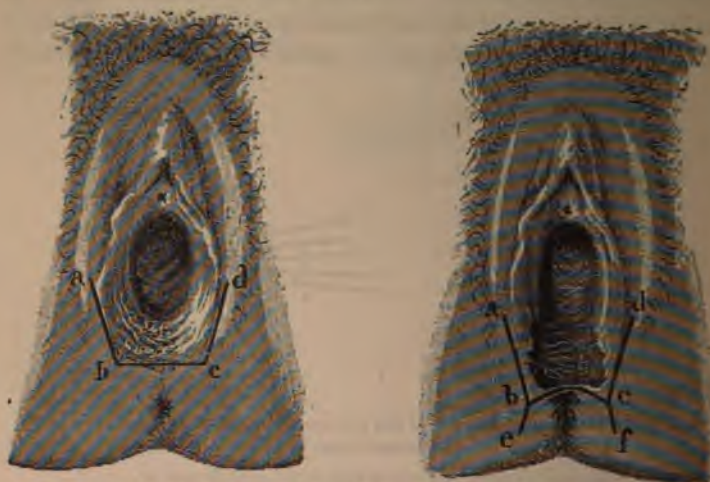


Fig. 452.—Rupture of the perinæum. Perineorrhaphy. Lawson Tait's operation.
Lines of incision.

a, b, c, d, incision for incomplete rupture; *a, b, c, d, e, f*, incision for complete rupture.

edge of the intact portion of the septum (fig. 453); laterally these two small flaps are attached to the thick, soft parts, which it will be necessary to divide. When putting in the first stitch, great care must be taken to make it traverse the extremities of the sphincter, the situation of which may be recognised before freshening by a slight dimple in the cicatrix. For these stitches Lawson Tait and Mundé use horse-hair, Säger silver wire (3 to 6 strands), as if the case were one of incomplete rupture. All the sutures end on the perinæum, and none of them are tied in the vagina or the rectum. Lawson Tait does not include the skin in the deep sutures; Mundé recommends that it should

be pierced.* Martin here also uses continuous catgut suture in superposed layers.

The only dressing is powdering with iodoform. The stitches may be removed on the seventh and the fourteenth days.

Lawson Tait's actual operation is essentially different from that which was at first described and illustrated under his name in certain works.†

Simpson's operations.—Chronologically, this method ought to be described before that of Lawson Tait, which it preceded by some years. But as it is of less importance I only add it as a kind of appendix. It is similar to Lawson Tait's as far as freshening is concerned, but is absolutely different as far as suture. I borrow Hart and Barbour's description of the operation.‡

A first incision starts from the extremity of the septum (between the rectum and the vagina), and following the internal surface of the labium majus from within outwards (fig. 454) ends at the point *l*; another incision is made from the point *a* parallel to the vulvar orifice, passing by the external extremity of the first incision, and stops at *b*, the extremity of the lacerated sphincter. A similar incision is made on the other side. The two triangular flaps thus traced out are dissected up (fig. 455). The flap *a, l, S* is raised in front of the vagina on each side in such a fashion that the angles designated by the figure *l* in the first woodcut come to



Fig. 453.—Complete rupture of the perinæum. Perinæorrhaphy.

Lawson Tait's operation.

* I am entirely of this opinion. Lawson Tait does not include the skin in the sutures, and thus forms small drains with the ends which pass between the lips of the wound which is not closed superficially; but this is a needless precaution when antiseptics are used, though the eminent Birmingham operator does not believe in them. I use a very large Hagedorn's needle for inserting the silver stitches. I have thus obtained four uninterrupted successes in four cases of complete rupture which extended a considerable distance up the septum.

† Edis. Diseases of women, London, 1882, p. 402.—Zweifel. Die Krank. der äussern weibl. Genitalien, &c. (Deutsche Chir., Lief. 61, 1885, p. 127).

‡ Hart and Barbour. Text-book of Gynæcology, French transl., 1886, p. 600.

be situated at 1 in the second. The same occurs with the flaps *b*, 2, *S*.

The vaginal flaps are stitched with silver wire or silk, care being taken to fasten the sutures on the vaginal side of the flaps; the ends of the sutures are long enough to hang out of the vagina. On the rectal side it is better to use catgut and cut the ends short. In order afterwards to approximate the raw surface that exists, two deep perinæal stitches are inserted and fastened over metallic plates; the operation is terminated by putting in some superficial stitches.

*Fritsch's operation.**—This operation is still more similar to



Fig. 454.—Complete rupture of the perinæum. Perinæorrhaphy.

Simpson's operation. Freshening.



Fig. 455.—Complete rupture of the perinæum. Perinæorrhaphy.

Simpson's operation. Suture.

Lawson Tait's. Like it, it depends upon the principle of splitting the tissues, substituted for freshening with the object of husbanding the vaginal and perinæal tissues which are partially destroyed, and as far as possible avoiding the formation of fresh cicatricial tissue. Fritsch contents himself with detaching the rectum from the vagina in incomplete rupture, and in complete rupture he adds a lateral incision for the purpose of finding the retracted

* Fritsch. *Die Krankh. der Frauen*, 8rd edit., 1886.—*Ueber Perineoplastik* (*Centr. f. Gyn.*, 1887, No. 30, p. 473).

ends of the sphincter; he joins them by the passage of a temporary suture which serves during the operation to re-form

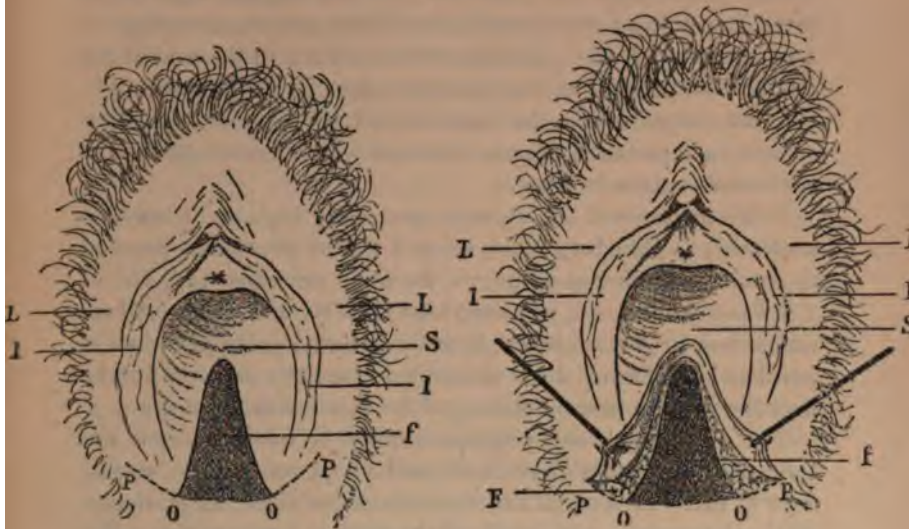


Fig. 456.—Rupture of the recto-vaginal septum. Flap-splitting operation (Fritsch-Walzberg).

Splitting and suture of the ruptured septum. *S*, recto-vaginal septum; *f*, clef or laceration in this septum; *L*, labium majus; *l*, labium minus; *P*, perinæum; *F*, rectal portion of the split septum.

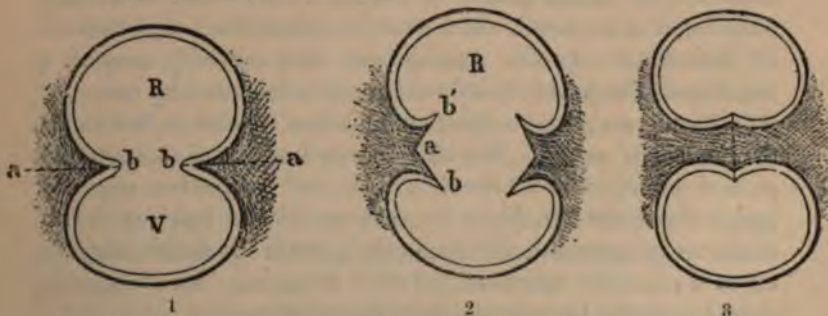


Fig. 457.—Rupture of the recto-vaginal septum. Flap-splitting operation (Fritsch-Walzberg).

Splitting and suture of the ruptured septum (diagrammatic). *R*, rectum; *V*, vagina; *a b b'*, incision.

1. Incision. 2. Flap-splitting. 3. Suture.

the orifice and allow of union being regularly proceeded with. He then stitches up the rectal mucous membrane by means of

interrupted catgut sutures, inserted by the vagina and tied at the bottom of the wound (Werth's hidden interrupted suture). These sutures must not penetrate into the rectum in order to avoid infection of the wound along their course, according to Lauenstein's precept. Similar sutures hidden in the wound are to close the vagina but not penetrate into it. There now only remains suture of the perineal wound by a series of hidden sutures in superposed stages, a method which Fritsch prefers to continuous suture in stages.

If the rupture of the septum reach very high up it may be necessary, as Walzberg * did, to split it and afterwards proceed to stitch it together according to the same principles (fig. 457).

After-treatment of perineorrhaphy.—The dressings reduce themselves to great care for cleanliness and local application of powdered iodoform. It is advisable to pass the catheter for the first few days to prevent soiling of the vulva with the urine.

The most important point to decide is whether after the operation the patient's bowels should be kept confined for several days or not. It is certain that the contact of faecal material may infect the wound, particularly if the stitches traverse the rectal mucous membrane, as in certain of the operations that I have described; but, on the other hand, the tardy passage of hardened faeces may cause it to give way. In point of fact the tendency becomes greater and greater to abstain from putting in stitches on the side of the bowel, which avoids contamination of the wound by defæcation. Lastly, constipation does not only present a mechanical danger of brief duration; it is injurious by reason of its influence on general nutrition, and thus it hinders indirectly the process of repair. The best course I think is to keep the patient on milk diet for the first week, and to give her a gentle purge about the fifth day. As soon as she has had one or two stools all purgation should be stopped, and if the simple laxative effect is exceeded opium should even be given. An evacuation should again be brought about four days later.

For the first few days following the operation the patient is sometimes tormented by the collection of gases in the intestine. A soft gum-elastic tube should then be carefully introduced through the anus to a depth of 6 to 8 cm. several times a day.

* Walzberg. Ueber Dammbildung vermittelt Spaltung des Septum bei durchgehender Zerreißung des Dammes (Arch. f. klin. Chir., 1888, vol. 37, p. 841).

The legs must be kept close together and should be loosely tied. The patient must not be allowed to sit up till after three weeks have elapsed.

The greatest cleanliness must be observed; the vulva and perinæum must be washed after each action of the bowels.

Careful watch must be kept upon the temperature of the patient. A rise of temperature will warn the surgeon that the wound has become infected, and that an abscess is likely to be formed. This generally starts at some point where the apposition was not perfect, a space in the depth of the wound in which blood or serum has been able to collect, which has furnished a nutritive medium for micro-organisms that were introduced during an operation that was not absolutely aseptic, or had effected an entrance along the track of the stitches. The part then becomes painful and tense, the stitches become buried in the œdematous tissues and cut through them. Unless they are removed quickly the inflammation becomes more intense, and of itself leads to complete disunion. Sometimes by removing one or two stitches at an opportune moment the inflammatory process may be circumscribed and only partial separation may occur. If it be on the perinæal side that a portion of the wound has failed to heal by first intention, it does not generally take long before it is completed by second intention. If it be towards the recto-vaginal septum the establishing of a fistula must be feared. When very small, this recto-vaginal perforation may become obliterated of itself or after a few cauterisations; if more extensive it will be permanent and will necessitate another operation, which the surgeon can hardly attempt before a month has elapsed from the perinæorrhaphy.

The pathognomonic symptom of this deep failure of union is incontinence of flatus, of which the patient again complains.

Speaking generally, the perinæal sutures of silver wire, silk, or horse-hair, should be removed as soon as they commence to cut into or irritate the tissues, which is about the tenth or twelfth day; if there be no sign of local irritation the surgeon should wait still longer, particularly if the stitches be silver. The vaginal stitches are removed last of all. There is no need to trouble about the catgut sutures.

The patient must not walk till after two months have elapsed, and sexual relations must be interdicted for six months.

Prognosis and results of perinæorrhaphy.—At the present time perinæorrhaphy is not a serious operation. It may be performed, generally, in a few minutes without recourse to chloroform, but with the sole assistance of cocain administered superficially and hypodermically. Neither excessive hæmorrhage nor septicæmia is to be feared. Cases of the latter complication which have been reported are all, with just a very few exceptions, of very ancient date.

Results, moreover, are much more complete now suppuration is hardly any longer a cause of anxiety. Formerly the lack of antiseptics and the multiplicity of sutures in the vagina and the rectum rendered infection of the wound in its deeper parts almost inevitable; union also frequently occurred superficially and failed deeper, leaving a recto-vaginal fistula which constituted an infirmity scarcely inferior to the absence of a perinæum. This accident is seen to occur much less frequently now that antiseptic precautions are taken, more attention is paid to the exact apposition of the deeper parts, and surgeons have learnt in the vast majority of cases to do without all other sutures than those of the perinæum (Emmet's and Lawson Tait's operations).

Lastly, the care that is taken to unite the deep muscular layers, to approximate the ends of the divided sphincter, explains the amelioration of results obtained from the point of view of the intestinal functions. Formerly patients were not unfrequently seen in whom the perinæum was apparently quite repaired, but who were quite devoid of control over flatus and liquid fæces.

Numerous cases prove that parturition may occur without fresh rupture of the perinæum, even when the surgeon had very considerably diminished the proportions of the vulva. Nevertheless one ought to guard against extreme narrowing of this orifice, as it is a fault in the operation.

Choice of operation.—Each of the methods that have been described has yielded satisfactory results. We may, therefore, say that they are all of them good. But, other things being equal, it is evident the preference will be given to the operation which will be simplest and most rapid in execution. This is the reason why Lawson Tait's operation is at the present day so

much the fashion. One cannot deny that it renders real services, but one could not renounce in its favour every other method. Many surgeons only accept it for incomplete rupture. Even then the objection has been raised against it, that it forms a little cul-de-sac behind the fourchette. For complete rupture Lawson Tait's operation is much less satisfactory, and many operators prefer older methods which have established their efficacy. Nevertheless good results may be obtained from its use, even when the recto-vaginal wall is very extensively ruptured, by splitting this septum up for a considerable distance, as Walzberg did, and suturing it in a preliminary stage. Nevertheless it is usually possible, by simple transverse splitting, to obtain sliding of the flaps from above downwards over a large extent. If necessary, the operation may be performed with the sole assistance of local anæsthesia produced by injections of cocain. Perinæorrhaphy often has to be preceded by curettage of the uterus, and an operation on the cervix necessitated by the accompanying metritis; the administration of chloroform is then preferable.

CHAPTER II.

INFLAMMATION, ŒDEMA, GANGRENE, ERYSIPELAS, ECZEMA, AND
HERPES OF THE VULVA.

INFLAMMATION OF THE VULVA, OR VULVITIS.

Pathological anatomy.—Symptoms.—Diagnosis.—Etiology.—Treatment.

Pathological anatomy.—The vulva is formed of very distinct portions from the point of view of general anatomy. It comprises the cutaneous reflexions; the labia majora; the mucous reflexions; the labia minora and the hymen; lastly, it presents the orifices of canals, viz., the meatus urinarius and the openings of Bartholin's glands.

Inflammation of these diverse parts takes on very different characters. The chief of these have been indicated under the names of "sebaceous vulvitis" limited to the integument, and "mucous vulvitis." But, as a rule, all the constituent portions of the region are affected by diffuse inflammation. No doubt it is true that it is the glands of the skin, sebaceous and sudoriparous (Verneuil), which are especially the starting-point of acne-pustules or boils situated on the labia majora. On the other hand, the openings of the excretory ducts of Bartholin's glands, the mucous crypts that are seen around the urethral orifice, and which Skene has described as glands, and the last-mentioned orifice itself, are the principal foci of inflammation of the mucous surface.

Inflammation of the inguinal glands is a frequent consequence of cutaneous vulvitis. It very rarely, in the absence of the puerperal state, leads to suppuration in the loose cellular tissue of the labia majora, but Bartholin's glands are very easily affected.

Symptoms.—Sharp local pain, increased by walking or by contact of urine, is the first symptom that calls the attention of

the patient. A more or less abundant, and sometimes offensive, discharge bathes the parts, irritates the internal surface of the thighs, and in children the groove between the buttocks. Erosion may be superadded, and the greyish colour of the base of the ulcers, coupled with enlargement of the glands, simulate a syphilitic lesion. The mucous membrane of the nymphæ, the fourchette, and the vestibule is red and swollen; grumous pus, mixed with smegma, collects between the labia majora and nymphæ. On the external surface of the former, which are œdematous, are seen very small pustules situated at the bases of the hairs. The largest of them resemble boils; they may be the cause of circumscribed abscess. Huguier* has described the cutaneous variety of the affection under the name of "vulvar folliculitis," and recognises three periods in it: one of eruption, one of suppuration, and one of decline. The termination may also, exceptionally, be by induration; the particular form of the small swelling that results from this evolution is very like that of acne sebacea; it is the "acne varioloformis" of Bazin, or the "exdermoptosis vulvaris" of Huguier. The small tumours thus formed are the size of a hemp seed, indurated, and not surrounded by any ring of inflammation; between them the skin is perfectly healthy.†

The inflammation varies in intensity. When very acute it may cause some rise of temperature; as a rule, then, there is some complication of lymphangitis or suppuration of the inguinal lymphatic glands. It is probably always to lymphangitis that must be attributed suppuration of the labium majus or "plegmonous vulvitis." It is rarely seen. Inflammation of the urethral orifice leads to dysuria. If the gland of Bartholin becomes inflamed, one is apprised of the fact by the tumour that it forms, and by the pus that exudes under pressure from its excretory duct.

Diagnosis.—Vulvitis is easy of recognition, but the important point is to determine exactly the complications present in the urethra, the vulvo-vaginal glands, or the vagina.

The ætiological diagnosis is also extremely difficult to make in some cases. One must not forget that in strumous children

* Huguier. On diseases of the secretory apparatus of the female external organs of generation (Mém. de l'Acad., 1850, vol. 15, p. 527).

† Gallard. Clinical lectures on the diseases of women, 1879, p. 335.

living under unhygienic conditions, very intense vulvar catarrh may supervene spontaneously, without contagion, by the simple decomposition of the smegma, and may lead to erosion or even ulceration. One must, therefore, not be in a hurry to conclude, without other proof, in a medico-legal examination that the case is one of rape or of contagion. Phlegmonous inflammation of the labium majus is distinguished from abscess of Bartholin's gland by the seat of the swelling and of the fluctuation at the external or cutaneous portion of this fold.

Ætiology.—Of all the causes of vulvitis, undoubtedly the most common is gonorrhœal infection. This is responsible even in many cases where one hesitates to incriminate it. For example, in the epidemics of vulvitis and vulvo-vaginitis one sees amongst the children of the same family, institution, or school, or in a hospital. (For greater detail on this point I refer the reader to the chapter on vaginitis.) There is no doubt, on the other hand, that independently of the gonococcus, the development of saprogenous micro-organisms in badly-kept children and women may lead to the occurrence of what might be denominated "sordid vulvitis." Scrofulous children and fat women, particularly of the lower classes, are on this account particularly liable to it. In children, thread-worms coming from the rectum may play a certain part.

In cases of vesico-vaginal fistula, the incessant contact of the urine irritates the vulva and the internal surface of the thighs; but the chronic irritation that it keeps up is of a somewhat special nature, does not provoke secretion, and is more nearly akin to chronic erythema than to vulvitis.

Treatment.—In the acute stage one would recommend baths, abundant lotions of boracic acid, extreme cleanliness, and rest. If there be the least suspicion that the affection is of gonorrhœal origin, soon afterwards the vulva should be painted over with a 2 per cent. solution of nitrate of silver. The pain is considerably lessened thereby, and it is an excellent antiseptic. Lotions and injections of sublimate (1 in 5000) should also be prescribed. The vulva should be sprinkled with powdered talc to which a tenth part of iodoform has been added. If the orifice of the vulvo-vaginal gland be inflamed, it should be touched with a pencil of nitrate of silver, after having enlarged it with the small knife invented by Weber for opening up the lachrymal

ducts. If the peri-urethral crypts seem to afford a refuge for the catarrh, an endeavour should be made to introduce into them a fine cauter, or simple ignipuncture around them may be practised.

Abscesses and bubos must be opened without delay.

ŒDEMA AND GANGRENE OF THE VULVA.

Œdema localised to the vulva is sometimes seen during pregnancy, on account of the obstruction to the circulation in the true pelvis, and the presence of varix of the external pudic veins. In the puerperal state, a little after parturition, if œdema of only one side of the vulva be observed, it is a certain indication of a local infection, and a laceration, a slough, or a patch of cellulitis will be found in the vagina.

In general anasarca the labia majora, the subcutaneous tissue of which is loose and arranged in lamellæ, become extremely swollen; micturition and catheterisation may be very difficult. Spontaneous ruptures, or small openings made intentionally into the skin, then allow the serum to escape, but they are also often the starting-points of erysipelas.

In syphilitic lesions of the vulva, and particularly in the infecting chancre, one sometimes finds a quite peculiar hard œdema, which often attracts the patient's attention much more than the chancre itself, which they look upon as an unimportant excoriation. This œdema, which lasts long after the ulceration has healed up, is especially situated in the nymphæ and the prepuce of the clitoris, which it transforms into a hard, hypertrophied tissue, very like that of elephantiasis. In one case of this kind I was obliged to excise a positive tumour which had existed for several months, and had not been modified by internal treatment. It is probably to cases of this kind that, at any rate, some of the cases of syphilitic hypertrophy of the vulva (fig. 458) described by McClintock* must refer.

Gangrene of the vulva may be caused by the injury inflicted by parturition, when to this local cause there is added the influence of a general infection, such as puerperal fever.†

* See Barnes. Clin. Treat. on Dis. of women, French trans., 1866, p. 746.

† Veillard. An epidemic of gangrene of the external genitals in puerperal women. Thesis, Paris, 1873.

The other kinds of septicæmia may have the same result: typhus, measles, scarlatina, small-pox, &c.

In debilitated and scrofulous children gangrene of the vulva may supervene in the same way as noma or cancrum oris. It may also be epidemic and fatal.

The object of treatment must be to keep the vagina antiseptic, and to separate its walls so that adhesions cannot be formed.

ERYSIPELAS OF THE VULVA.

Primary erysipelas of the vulva is seen with a fair amount of frequency in the newly born, though it occurs in the neigh-



Fig. 458.—Hard hypertrophic edema of the left labium minus, secondary to syphilitic infection (MacClintock).

bourhood of the umbilicus. It is very serious, and frequently ends by producing fatal peritonitis.

In adult women at the monthly periods is sometimes observed an attack of erysipelas, which recurs periodically. It has even been known to return at the menstrual period, when there has been no loss of blood, and has then been looked upon as a supplementary phenomenon.* It is probable that the pathogenic micro-organisms remain *in situ*, but lie latent until they

* Rouvier (Marselles). Some supplementary menstrual phenomena (*Ann. de Gyn.*, 1879, vol. 12, p. 120).

are roused into activity each month by the congestion produced by the catamenial molimen.

As treatment, local applications of powdered talc, oxide of zinc, or painting with ethereal tincture of camphor give some relief. Hüter and Boeckel have recommended hypodermic injection of one or two Pravaz syringefuls of a two or three per cent. solution of carbolic acid at the margin of the erysipelatous inflammation repeated night and morning. Lücke has prescribed friction with turpentine.*

ECZEMA OF THE VULVA.

This affection may be present on the labia majora and the mons veneris, with either acute or chronic characters.

In the acute variety the onset is sudden, and manifests itself by a burning sensation and an intense red colour. Small transparent vesicles, the size of a pin's head, are scattered over the skin; but they are frequently difficult to recognise on account of having been ruptured by scratching. To see them the skin should be illuminated laterally and looked at obliquely. There is often some slight gastric trouble and a little fever. This eruption generally attacks persons of arthritic tendency and in the spring-time. After a fortnight the acute attack comes to an end, but the disease may pass into a chronic stage.

Chronic eczema is generally of the type called by Hebra "eczema rubrum," whereas in the acute variety the labia majora alone are usually affected; in this variety the disease may extend to the mons veneris, the upper and internal surfaces of the thighs, the perinæum, and the anus. The labia are swollen, the vulva gapes, and since it is bathed with muco-pus, for the moment one might think that the case was one of gonorrhœal vulvitis. There is intense itching and burning sensation. Painful fissures may occur at the fourchette, the anus, or in the inguinal folds. Excoriation is followed by the formation of crusts.

According to Hebra more than half of these cases are accompanied by disorders of menstruation; the same has been

* Cf. Zweifel. Die Krankh. der äusseren weibl. Genitalien, 1885, p. 50.

noticed in the case of herpes (Lagneau). The influence of diabetes mellitus and of rheumatic affections is indubitable.

Care must be taken to avoid confusing syphilitic ulceration with the excoriations and fissures that may be the consequence of chronic eczema. With regard to herpes, it is distinguishable by the agminate arrangement of the vesicles and their larger size; the dermis also is more thickened in eczema. Simple vulvar pruritis is not accompanied by an eruption.

Treatment in the acute stage should consist in the application of fæcula plasters and in frequent use of laxatives. An unstimulating diet should be ordered, and spices and pork prohibited. In chronic cases lotions of sublimate (1 in 1000) and an ointment of 2 grammes of oxide of zinc, 1 gramme of iodoform, and 30 grammes of lanolin will be used with advantage. General treatment of rheumatism, scrofula, or diabetes must not be neglected.

HERPES OF THE VULVA.

Symptoms; discrete and confluent varieties.—*Diagnosis* from mucous plaques, syphilitic chancre, simple chancre and syphilides.—*Treatment*.

Symptoms.—This affection is characterised by the presence of small transparent vesicles, varying in size from that of a pin's head to that of a lentil, collected into groups, which are sometimes few in number, sometimes multiple, which makes it necessary to distinguish a *discrete* from a *confluent* variety. A yet more rare variety is *solitary* herpes (Fournier), which is formed by a single erosion, sometimes of rather large extent, and resulting from the rupture of a single group of vesicles.

Herpes always causes at first itching, and a characteristic burning and smarting sensation.

First of all a diffuse or patchy redness is seen, which afterwards becomes covered by a collection of vesicles, forming a kind of archipelago. Several islands close to one another sometimes fuse and become converted into a large pemphigoid bulla. When the vesicle is broken, there remains a raw surface of the dermis, bright red or whitish, as if covered by a false membrane; the edges of this ulceration are festooned; it becomes covered by a crust, under which cicatrisation occurs in a week or fortnight. When the crust falls off, the skin beneath, pinkish and

swollen, sometimes looks very like that of a syphilitic papule. The inguinal glands frequently become enlarged, but do not often suppurate. They are painful, and this point serves to distinguish this adenitis from the enlargement that occurs in syphilis. Febrile gastric disturbance usually accompanies confluent herpes. The eruption is seen to appear most frequently one or two days before a menstrual period. In some women it recurs regularly at these times ("menstrual pimples"); it is also very often seen during pregnancy. The congestion of the organs of generation is then evidently a predisposing cause.

Any irritation of the vulva may produce an "accidental" herpes, such as gonorrhœal or syphilitic infection or neglect of personal cleanliness; herpes may also be constitutional, to use the classical term, that is to say, may be induced by the least local irritation in persons of arthritic and dartsous or herpetic diathesis.

Diagnosis.—Fournier has warned us against confounding chancre and solitary herpes, or mucous plaques, and the ulceration that follows on discrete or confluent herpes. The syphilitic chancre presents the appearance of an erosion rather than that of an ulceration; it is not depressed, but, on the other hand, frequently projects somewhat; its surface is smooth, shiny, and deep red. Sometimes, however, its surface is slightly hollowed out in the centre, and this forms what has been called the "ulcerating" variety. But in the "eroding" variety the chief lesion seems to be constituted, not by the loss of substance, which is insignificant, but by a small indurated parchment-like plate, which can only be recognised by taking up a fold of the integument between the thumb and fore-finger, at a certain distance from the lesion and parallel to its surface. The indolent solitary enlargement of the glands is characteristic. There is neither smarting nor itching with chancre. The typical evolution of herpetic lesions in a week or fortnight for the same group, the co-existence of other characteristic symptoms in syphilis will also render great assistance. But in some cases diagnosis has long to remain doubtful. Simple chancre might be confounded with the confluent variety of herpes. In point of fact this lesion is always multiple, but the appearance of chancrous ulceration is very different from that which follows upon the vesicles of herpes. The base in the

former case is irregular, rough, and yellowish, the edges are sharply cut and undermined, and the pus from the ulcer is thick and abundant. Suppurative lymphadenitis or bubo frequently co-exists. Inoculation would give a positive proof; but it is better not to resort to this mode of diagnosis, as it might give rise to accidents.

Syphilides of the vulva, which present themselves as papular, eroding, or ulcerating, are scattered generally much more abundantly and over a much greater extensive surface than the lesions of herpes. They must not be confused: the eroding form alone has no proper characteristics, and can only be distinguished by the presence of other signs of syphilitic infection; the ulcerating variety consists of ulcerations with circinate or crescentic-shaped edges, and co-exists with mucous plaques in other places, *e.g.*, the mouth, the margin of the anus, between the toes, and with other syphilitic manifestations. The papular variety consists of a flattened round or oval plate of coppery-red colour, and having a dry or an ulcerated surface ("papulo-erosive" variety of Fournier). One can see how greatly such a lesion differs from herpes; it is, moreover, rarely localised to the vulvar region, but is disseminated over the whole of the body.

Herpes of the vulva has never proved inoculable.*

The object of treatment at first, especially in the confluent variety, is to ease the pain by prolonged warm baths, fæcula-plasters; ulcerations should be dusted over with a mixture of equal parts of oxide of zinc, of subnitrate of bismuth, and of iodoform. If healing be long in taking place, they might be also touched with a 2 per cent. solution of nitrate of silver. The general health must also be treated at the same time so as to prevent the return of the lesion, which depends particularly upon diathetic predisposition.

* Bruneau. Study of the herpetic eruptions that occur on the female generative organs. Thesis, Paris, 1880.

CHAPTER III.

ULCERATION OR LUPUS OF THE VULVA.

Definition.—Pathological anatomy.—Symptoms. Ulcerating variety; hypertrophic variety.—Diagnosis.—Prognosis.—Ætiology.—Treatment.

Definition.—The name of ulceration or lupus of the vulva has retained since Huguier, who was the first to distinguish this affection,* a purely clinical significance. It has no doubt been applied to lesions of the most varied natures, having the common characteristics of a tendency to hypertrophy, and to a slow and progressively destructive ulceration of the vulvar region, but unaccompanied by invasion of the lymphatic glands and the neighbouring parts, characteristic of cancer. Certain varieties of this affection have been with justice compared with lupus of the face, both as regards appearance and as regards its course. Nevertheless, though lupus of the face has been demonstrated to be a tubercular affection, such has not yet been proved to be the case with lupus of the vulva.

Pathological anatomy.—Since every ulceration running a slow course and accompanied by hypertrophy of its edges has been called by this name, it is not astonishing that the most diverse histological changes have been met with. Changes have been found comparable to those of elephantiasis (Renaut), of columnar epithelioma (Cornil),† of “Wagner’s syphiloma,” or the gummatous tumour in different stages of nodulation, ulceration, or sclerosis (Paul Petit).‡ In other cases all the lesions have been limited to an inflammation of the dermis, and an infiltration of the connective tissue by embryonic elements, particularly around dilated vessels § (figs. 459 and 460).

* Huguier. On lupus of the vulva and perineum (Mém. de l’Acad. de méd., 1849, vol. 14, p. 507).

† Cornil. Arch. de tocol., 1874, vol. 1, p. 412, and Bull. Soc. Anat., 1874, p. 231.

‡ P. Petit. Arch. d’Obst. et de Gyn., 1889, vol. 4, p. 6.

§ Leroy des Barres. Bull. Soc. Anat., Jan., 1870, p. 72 (Histological examination made by Cornil).—J. Matthews Duncan. On the ulceration or lupus of the female generative organs, &c. (Trans. Obst. Soc., Lond., 1885, vol. 27, pp. 139 and 230 (Histological examination made by Thin).

Symptoms.—Two clinical varieties may be recognised, according as ulceration or hypertrophy predominates.

1. *Ulcerating variety.*—Of this several sub-varieties have been described: erythematous lupus is a very superficial ulceration of livid red colour, similar to the lupus erythematosus of the face; tubercular lupus is composed of projections of scattered hypertrophy which raise the base of the ulcer. The ulcer has bevelled edges, and is leaden or violet in colour. One of the most important characteristics is the facility with which cicatrisation



Fig. 459.—Lupus of the vulva (Thin).

Section of the external surface. *a*, epithelium (normal); *b*, blood-vessel; *c*, infiltration of small cells around the vessel; *d*, fusiform connective-tissue cell.

occurs spontaneously on one side, while ulceration is proceeding on the other; this reparative process may occur and then break down at the same spot several times in succession. The ulcer is said to be “serpiginous” when it sends long and sinuous prolongations towards the vestibule, “perforating” when it excavates deep fossæ.

There is but little discharge from the ulcerated surface.

Deep perforations and fistulæ with the rectum or the bladder may be produced. Partial cicatrisation of the ulceration has

been known to give rise to narrowing of the meatus urinarius or the anus.

2. *Hypertrophic variety*.—Hypertrophy, which is rarely com-

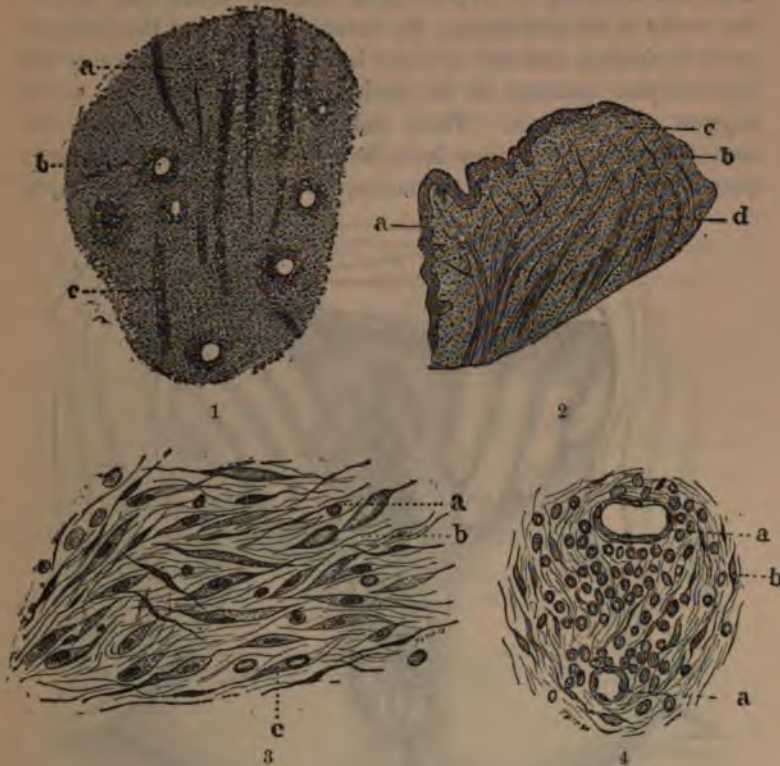


Fig. 460.—Lupus of the vulva (Thin).

1. Specimen from a region where there were many blood-vessels and a considerable amount of small-celled infiltration. (Slight enlargement.) *a*, small-celled infiltration; *b*, transverse section of blood-vessels showing the peri-vascular infiltration; *c*, blood-vessels seen longitudinally.
2. Specimen seen under a very low power (4 diameters) to show the numbers of blood-vessels going towards the epithelium; *a*, epithelium; *b*, blood-vessel; *c*, young connective tissue containing many cells; *d*, connective tissue already sufficiently developed for bundles of fibres to be seen in it.
3. Higher power. *a*, leucocyte; *b*, fibrous tissue in way of formation; *c*, flattened fusiform cell.
4. *a*, *a*, blood-vessels cut across; *b*, fusiform cell of fibrous tissue in way of formation.

pletely absent in the preceding variety, here takes on considerable proportions; the nymphæ and the prepuce of the clitoris may

become twice or three times as large as normal, and seem to be infiltrated with a hard œdema which gives them an elastic consistency; at certain other points of the surrounding skin are scattered tubercles or hypertrophic nodules which may invade the whole of the perinæum; the internal surface of the diseased parts is shining, and red or violet in colour. In some cases the hypertrophic increase of the labium majus is so great as to suggest elephantiasis. These indurated parts are rarely the seat of pain, unless they have become temporarily inflamed; caruncles of the meatus urinarius, however, are usually very



Fig. 461.—Lupus of the vulva (MacClintock).

tender (Duncan). The hypertrophic and ulcerating varieties are sometimes separate, but usually the disease occurs in a mixed form.

Diagnosis.—The slow course of the ulceration, its accompanying hypertrophy, and the absence of any notable enlargement of the glands, will distinguish it from phagedænic chancre, tertiary syphilitic manifestations, and cancer. It cannot be confounded with elephantiasis, in which there is neither marked induration of the tissues nor spontaneous ulceration.

Prognosis.—This disease is serious, although its course is slow; it may last for eight to ten years.

Death has been known to supervene from peritonitis as the result of propagation to the rectum.

Ætiology.—Lupus of the vulva is a rare disease. It has been most frequently seen in women of the lower classes, prostitutes from twenty to thirty years of age. An important predisposing cause seems to be tuberculosis, of which, perhaps, frequently it is only a cutaneous manifestation, although anatomical demonstration of the fact has not yet been given. Nevertheless it must be noted that one patient of Le Fort's, two of Bernutz's, and two seen by Fiquet,* had very clear tubercular antecedents. All causes which lead to physiological poverty, privations, excesses, hereditary syphilis, predispose to vulvar lupus.

Treatment.—This consists essentially in cauterisation of the ulcers and excision of the hypertrophied tissues. The actual cautery is greatly preferable to liquid caustics, such as fuming nitric acid (E. Martin), caustic potash (G. Veit), sulphuric acid (Guillaumet). With regard to scarification and scraping with a sharp spoon, which have proved so serviceable in lupus of the face, their only chance of success would be in the erythematous or superficial variety. Iodoform dressings† and painting with tincture of iodine have also been productive of some success.

* Fiquet. Essay on lupus of the vulvo-anal region. Thesis, Paris, 1876.

† Siredey. Soc. méd. des hôp., Meeting of July 22, 1876, p. 220.

CHAPTER IV.

TUMOURS OF THE VULVA.

Varicose tumours.—Hæmatoma or thrombus.—Simple vegetations. Treatment.—Elephantiasis. Pathological anatomy. Symptoms. Diagnosis. *Ætiology* Treatment.—Fibroma and fibro-myoma. Myxoma.—Lipoma.—Enchondroma.—Neuroma.—Cysta.—Vascular tumours of the meatus urinarius. General considerations. Pathological anatomy. Polypus. Prolapse of the urethral mucous membrane. *Ætiology*. Symptoms. Diagnosis. Treatment.—Cancer of the vulva. Pathological anatomy. *Ætiology*. Symptoms. Course and prognosis. Diagnosis from: papillary vegetations; polypus of the meatus; infecting chancre; syphilides; simple chancre. Treatment.

VARICOSE TUMOURS.

DURING pregnancy it is very common to see varices of the labia majora. The varicose tumours may reach to a considerable size. Holden cites a case in which the pudenda were as large as the head of a fœtus; the patient died of phlebitis.

As a rule varices only cause a sensation of weight and a little difficulty in walking. They appear as large bluish or violet bunches on the mucous surface. They produce severe symptoms of hæmorrhage when they happen to rupture, as the result of a strain or of injury. Rupture may even be spontaneous.* Several cases of fatal hæmorrhage are on record.† The varicose part should therefore be supported and gently compressed by means of a T-shaped bandage.

HÆMATOMA OR THROMBUS.

Subcutaneous rupture of a varicose vein, often unrecognised before the accident, is the cause of hæmatoma of the vulva. It usually occurs during labour, and as the result of slightly

* Hesse. *Mediz. Zeit.*, Berlin, 1842, No. 48, p. 214.

† P. Budin. On varices in pregnant women. Thesis, 1880.—Moussaud. On varix of the vulva and the hæmorrhage resulting from its rupture. Thesis, Paris, 1889.

excessive violence upon the part of the accoucheur, or extreme expulsive efforts on the part of the mother, or too precipitate an exit of the head. Apart from pregnancy hæmatoma has hardly been seen but as the result of blows or falls, and then its dimensions are much less.

One labium only is as a rule distended by the blood. It immediately becomes of a violet colour, and may reach to the size of the fetal head. It is a serious complication of labour. Out of 120 cases collected by Girard * there occurred 24 deaths.

The blood tumour may rupture and cause fatal hæmorrhage, or may suppurate and lead to septicæmia. To avoid this complication, the surgeon must intentionally incise every hæmatoma that exceeds the fist in size, clear out the cavity, catch up the bleeding vessels, if necessary in forcipressure forceps, and stuff the cavity with iodoform gauze. On the other hand, the care of absorbing a small thrombus may be entrusted to nature; perfect antisepsis of the vagina must, however, be ensured.

SIMPLE VEGETATIONS.

These growths are sometimes also described under the name of "condylomata" or "papillomata." The tumours are cauliflower excrescences, sometimes of very large size, and are composed of hypertrophied papillæ of the skin, or of the vulvo-vaginal mucous membrane. Often isolated, and presenting the appearance of a cock's comb, of which they have received the name, they may, when agglomerated, form masses as large as the head of a fœtus. They are pinkish-white or like claret in colour, and are situated over the whole extent of the vulva, the perinæum, and the margin of the anus; they may also exist in the vagina (fig. 462).

In the enormous mass that may be formed by a collection of these vegetations, groups of different orders, separated by more or less deep furrows, are to be distinguished. They are accompanied by a sanious and fœtid discharge; friction during walking causes them to become inflamed and painful: the

* Girard. Contrib. to the study of thrombus of the vulva and vagina. Thesis, Paris, 1874.

fissures that form at their bases become the seat of a true hyperæsthesia.

Vegetations have long been regarded as a certain indication of venereal infection, either gonorrhœal or syphilitic. And there is no doubt that they are generally produced by the irritating discharge of vulvar mucous plaques by the gonorrhœal pus, particularly in women who do not pay sufficient regard to



Fig. 462.—Simple vegetations of the vulva (Tarnier).

cleanliness. But "cock's combs" have also been observed in pregnant women who are affected with simple leucorrhœa. They seem, therefore, to be the result of sordid irritation of the papillæ much rather than that of contamination by a virus.

Transmission by contact and inoculation of vulvar papillomata has not been demonstrated.*

Treatment.—The best and simplest treatment is snipping

* Kranz. *Deutsches Arch. f. klin. Med.*, 1867, vol. 2, p. 79.—Petters (*Viertelj. f. Dermat. u. Syph.*, 1875, p. 255) and Günts (*Berl. klin. Woch.*, 1876, No. 39, p. 561) have made on this point experiments which are not conclusive.

them off with scissors, while continuous irrigation during the operation is carried on, followed by cauterisation of the base of the tumours with the thermo-cautery or over-casting suture of the linear wound. This operation may be performed painlessly with cocain, and at several sittings if the tumour be very large. I believe that the surgeon need not hesitate to operate during pregnancy, which there is not the slightest risk of interrupting by so small an operation. It is, in point of fact, extremely important that the generative canal shall not present any source of infection at the time of parturition. Zweifel* has reported a case which occurred in his practice, in which fatal pelvic suppuration originated from condylomata of the vulva that infected a laceration of the vagina caused by labour.

ELEPHANTIASIS.

Pathological Anatomy.—Symptoms.—Diagnosis.—Ætiology.—Treatment.

Elephantiasis Arabum (which must not be confounded with lepra or elephantiasis Græcorum) is formed by a hyperplasia of the skin and subcutaneous cellular tissue. It is most commonly seen to affect the lower limb (95 per cent. of cases), and its name arises from the appearance which results therefrom being similar to that of an elephant's foot. It is also seen, though less commonly, on the scrotum and penis of the male, and the pudenda and clitoris of the female.† It is very rarely seen in our latitudes.

Pathological anatomy.—The hypertrophied labia majora form large masses, which may exceed in size that of an adult head, and the weight of which may reach 22 lbs. As a rule, their base is broad, but occasionally there occurs true pediculisation, and the tumour affects the shape that older writers described under the name of "molluscum pendulum," a clinical term which included, in addition, all polypoid tumours of the skin, whether elephantiasis, lipoma, fibroma, or myxoma. Many of the cases formerly published as so-called elephantiasis with integrity of the skin seem to me to have arisen from this confusion.

* Zweifel. *Loc. cit.*

† Rokitsansky. *Allg. Wien. med. Zeit.*, 1881, p. 477.—H. A. Kelly. Elephantiasis of the clitoris (*Johns Hopkins Hospital Reports*, 1890, vol. 2, p. 227).

On histological examination three principal varieties may be recognised:*

1. In the first the whole of the hypertrophied dermis returns to an embryonic condition. In the midst of this transformed tissue are formed vast lymphatic lacunæ comparable to those met with in lymphangiomata.

2. In the second variety, which often comes on after repeated œdema, the engorgement of the tissues is extended over a very large surface. There is stagnation of the lymph in the

lymphatic capillaries, vessels, and spaces. It is especially in this class of case that the lymphatic glands themselves are affected, and undergo a fibrous change.

3. The third variety is remarkable for an enormous increase in thickness of the dermis. Here there exists an abundant proliferation of the various elements that make up the dermis, connective tissue, elastic tissue, smooth muscular fibres. As in the two former varieties, so here also there is great dilatation of the lymphatics. Obliteration of the lymphatics has also been observed as the result of endothelial proliferation (Hildebrandt).



Fig. 463.—Elephantiasis of the vulva.

Some pathologists have regarded the stagnation of the lymph, and its greater abundance, as playing an important part in the pathogenesis of the elephantiasis, thinking it to be able of itself to bring about hyperplasia of the elements that it bathes. To sum up, whatever be the variety seen, the constant anatomical lesion that dominates all the others is dilatation of the lymphatic vessels.

* De Sinéty (Text-book of Gynecology, 1884, p. 109) attributes this description to Cornil and Ranvier.

Symptoms.—The chief of these is the swelling, which soon becomes an obstacle to micturition and walking. Ulceration may occur as the result of friction, but it has a natural tendency towards recovery. The thickening of the tissues may invade the whole of the vulvar, perineal, and anal region, and may form an enormous tumour. It is unaccompanied by pain, but amenorrhœa is often present. The following sub-varieties have been distinguished: elephantiasis glabrosa, when the skin is smooth; verrucosa, when it is covered by irregularities; papillomatosa, when these prominences are much hypertrophied; dura, when the consistency is hard; mollis, when the tissue yields to pressure, or may even pit as it does in œdema.

Diagnosis.—This can scarcely present any difficulty; the hypertrophic tumefaction of lupus is always accompanied by ulceration, and is confined within very narrow limits. Papillary vegetations are implanted upon the skin, whereas in elephantiasis the thickening is of the meshwork itself of the dermis. Pediculated fibromata and myxomata, which have sometimes by an abuse of terms been called "partial elephantiasis," are always isolated and circumscribed tumours, whereas elephantiasis is essentially diffuse.

Ætiology.—This affection, which is very rare in our latitudes, is common in the Antilles Islands, and particularly common in Barbados. In these places, the onset is frequently marked by an acute lymphangitis, accompanied by high fever. Traumatism has been noticed in some cases (Verneuil).

Treatment.—The only rational treatment is removal. I prefer the knife to the écraseur, the thermo-cautery, and the galvano-cautery. A careful attempt should be made to secure union by first intention; suppuration would here be particularly dangerous on account of the great development of the lymphatics.

FIBROMA AND FIBRO-MYOMA—MYXOMA.

These tumours usually arise from the labia majora, although they have also been known to start from the perinæum, and even the nymphæ. They contain fibrous tissue alone or mixed with smooth muscular fibres or myxomatous tissue. They often become pediculated, forming, when they are of soft consistency,

one of the varieties of what old writers used to call "molluscum pendulum"* (Willan), and what has more recently been described under the name of "molluscum simplex."†

These tumours are innocent, and run a very chronic course; they may be enucleated, or the pedicle may be divided without fear of hæmorrhage.

LIPOMA.

Lipomata of the vulvar region take their origin from the fatty panniculus of the labia majora or the mons veneris. They may reach a very large size, and at the first glance suggest elephantiasis. Stiegele‡ removed one that weighed 10 pounds. In a case seen by Bruntzel,§ the tumour underwent considerable increase in size during a pregnancy.

On section the tumour is found to consist of islands of fat, traversed by strong bands of fibrous tissue. Removal presents no difficulty.

ENCHONDROMA.

Enchondroma of the vulvar region is a pathological curiosity. One case is known in which the clitoris was the seat of a cartilaginous tumour as large as the fist; it was pediculated, and in parts had become calcified (Schneevogt).|| A case of so-called ossification of the clitoris reported by Beigel¶ perhaps is of the same kind, as well as the curious case seen by Bartholin,** and so frequently cited, relating to a courtesan of Venice who used to wound her lovers with her ossified clitoris.

NEUROMA.

I have found two published cases of this condition: one by Simpson,†† in which there were painful nodules close to the

* Bazin. Theoretical and clinical lectures on cutaneous affections, &c., Paris, 1862.

† Marfan. Arch. de tocol., 1882, p. 705.

‡ Stiegele. Zeitschr. f. Chir. u. Geb., 1856, vol. 9, p. 243.

§ Bruntzel. Centr. f. Gyn., 1882, p. 626.

|| Schneevogt. Verhandl. van het Genootschap ter Bevord. der Genees en Heelkunde te Amsterdam, 1855, vol. 2, p. 67.

¶ H. Beigel. Die Krankh. des weibl. Geschlechts, 1875, vol. 2, p. 728.

** Th. Bartholin. Hist. anat. et med. rar. cent. III., Copenhagen 1661 (hist. 69).

†† Simpson, cited by P. Zweifel, loc. cit., p. 85.

meatus urinarius; the other by Kennedy,* in which the tubercles, painful on contact, could only be seen with the aid of a lens. This last observation is not incontestable.

CYSTS OF THE VULVA.

I shall later describe cysts of Bartholin's glands, which form the greater number of cysts of the vulva. Independently of these, cysts having different origins may exist on various portions of the vulva.

A. *On the labia majora*, superficially, sebaceous cysts. Winckel operated upon one as large as an egg.†

Deeply, serous cysts, which many writers would regard as encysted hydroceles of the round ligament, and which, according to Duplay,‡ are almost always saccular cysts developed in an unoccupied hernial sac. Blood cysts have also been observed in the labia majora, situated at the upper part of these folds. Like the serous cysts of which I have just spoken, they are quite distinct from cysts of Bartholin's gland. According to Koppe§ they are due to a hæmatocele in the interior of the terminal portion of the round ligament. Weber|| has, in point of fact, shown that in the embryo this cord is hollow, and this cavity might abnormally persist. In the opinion of other writers these collections of blood, like those of semen, always are situated in unoccupied hernial sacs (see the chapter on tumours of the round ligament).

Cystic formations are also seen in this region, the origin of which is very obscure. The structure of these tumours would recall that of ovarian cysts.¶ Klob** has put forward the view that some of these cysts are developed around thrombi, others by lymphangiectasis.

Lastly, several cases are known of dermoid cysts, containing dermal tissue, hair, and even teeth.††

* Kennedy. *Med. Press and Circ.*, June 7, 1874.

† F. Winckel. *Lehrb. der Frauenkr.*, 2nd edit., 1890, p. 29.

‡ Duplay. Serous and watery collections in the groin. *Thesis*, Paris, 1865.

§ Koppe. *Zur Genese und klin. Deutung der Vulvarcysten* (*Centr. f. Gyn.*, 1887, No. 40, p. 639).

|| Weber, cited by Gottschalk. *Centr. f. Gyn.*, 1887, No. 21, p. 334.

¶ Werth. *Zur Anatomie der Cysten der Vulva* (*Centr. f. Gyn.*, 1878, p. 512).

** Klob. *Path. Anat.*, p. 465.

†† Klebs. *Handbuch, &c.*, 1873, p. 987.

B. In the vestibule between the meatus urinarius and the clitoris, cysts have been seen reaching the size of a haricot bean, containing a straw-coloured serous fluid, and lined by cylindrical epithelium. They probably are formed from small sebaceous glands.*

C. On the sides of the meatus urinarius, Kocks† has described a very short cul-de-sac, which is the terminal remains of Gärtner's canal. Possibly the small cysts that may be met with in this situation arise therefrom. On the other hand, Skene‡ has found and given illustrations of two glands between the mucous and muscular coats of the urethra, of which the excretory duct, 2 to 3 cm. in length, and capable of taking a No. 1 catheter, opens at the meatus urinarius. Might certain cysts be formed at the expense of these glands? This is a hypothesis which needs to be confirmed by observation.

D. At the hymen, congenital cysts were first observed by Winckel.§ They are very small, and contain the products of the disintegration of squamous epithelial cells. Döderlein|| attributes their formation to union of two folds of the hymen with consequent formation of a closed cavity; he has been able to catch them in process of formation. This origin recalls that obtaining in the case of certain small cysts of the vagina.

VASCULAR TUMOURS OF THE MEATUS URINARIUS.

General considerations.—As I have endeavoured to show,¶ the hymen does not form an isolated organ, but only the greater part of a hymeneal apparatus which consists of: (1) the masculine bridle of the vestibule (*la bride masculine*); (2) the frame of the meatus urinarius; and (3) the hymen. If the meatus urinarius of a little girl or a young virgin be carefully

* G. Peckham (Amer. Jour. of Obstet., 1891, vol. 24, p. 1155) saw a case of cyst of the clitoris containing about 60 grammes of a chocolate-coloured liquid.

† Kocks. Arch. f. Gyn., 1882, vol. 20, p. 487.

‡ Skene. Treatise on the diseases of women, 1886, p. 614.

§ Winckel. Loc. cit., p. 82. (The two first cases seen during the winter of 1833-4 at the clinique of Munich were published by Bastelberger, one of Winckel's pupils.)

|| Alb. Döderlein. Arch. f. Gyn., 1886, vol. 29, p. 284.—See also Zeigenspeck. Ibid., vol. 32, Part 1, p. 159.—O. Piering. Prag. med. Woch., 1887, No. 49, p. 409.

¶ S. Pozzi. On the masculine bridle of the vestibule and the origin of the hymen (Comptes rendus et mém. de la Soc. de biologie, Jan. 26, and Feb. 16, 1884).—Ann. de Gyn., April, 1884, vol. 21, p. 268.

examined while the hymen is drawn downwards, the upper prolongation of this membrane is very clearly seen to surround the external urethral orifice by a true ring which forms the upper and very small loop of a figure of 8, the lower and proportionately enormous loop of which is formed by the hymen. This figure of 8 is surmounted by a thin vertical band, the masculine bridle which starts from the meatus and is lost in the upper third of the vestibule. The frame of the urethra forms in some women a projecting ridge, from the lower portion of which is detached a small tongue which forms a kind of uvula inverted into the interior of the canal. This dependence of the hymen is sometimes so clear and distinct that, by analogy, it might be called the "urethral hymen." Like the vaginal hymen, it has been known abnormally to form a continuous membrane, giving rise to an imperforate condition of the meatus urinarius; like it also,* it may exceptionally present an erectile structure which testifies to its homology with the corpus spongiosum of the male urethra, of which the hymeneal apparatus represents the undeveloped tissue, the non-erectile fibro-elastic frame-work.

I believe that the foregoing considerations throw a certain amount of light upon the pathogenesis of vascular tumours of the meatus urinarius.

Pathological anatomy.—First of all pointed out by Morgagni,† shortly described by Boyer‡ and other writers, these tumours, which are generally pediculated and deserve to be called polypi, were for the first time subjected to histological examination by G. Simon§ and Verneuil,|| who described them under the name of "papillary polypi," and laid great stress upon their extreme vascularity. This is so great that writers have called them "urethral hæmorrhoids,"¶ and that Wedl** compared the vessels of this pathological tissue to the vasa vorticosa of

* Henle has cited some cases in which the hymen contained cavernous tissue in its substance. This peculiarity explains the very serious hæmorrhage that sometimes occurs on defloration.

† J. B. Morgagni. *De sedibus et causis morborum*, &c. Leyden, 1767, vol. 3, epist. 50.

‡ Boyer. *Surgical diseases*, vol. 10, p. 404.

§ G. Simon. *Charité-Annal.*, 1850, vol. 1, p. 2.

|| A. Verneuil. *Comptes rendus des séances de la Soc. de biol.*, 1855, p. 123.

¶ Richet. *Gaz. des hôp.*, 1872, No. 64, p. 505, and No. 65, p. 514.—Hutchinson. *Lancet*, 1874, vol. 2, p. 835.

** Wedl, cited by Winckel. *Die Krankh. der weibl. Harnröhre und Blase* (Deut. Chir., Lief. 62, p. 55).

the choroid. In Virchow's opinion the point which differentiates them from ordinary telangiectatic tumours is that the walls of the vessels are neither thickened nor dilated. Jondeau* made a histological examination of two specimens of urethral polypus. At the base he found adult connective tissue with a fairly considerable admixture of elastic tissue. Between the trabeculæ of this tissue, separating the bands from one another were large dilated vessels that had kept their own wall, and that by their junction at certain places formed positive pools of blood. In a section of the tumour parallel to its axis all these vessels appeared to be cut more or less obliquely, and even longitudinally, showing their direction to be parallel to the axis of the pedicle. Further away, in the substance of the tumour, the adult connective tissue was replaced by an embryonic tissue characterised by a fine meshwork and connective fibres. Here also and right up to the periphery of the tumour dilated vessels were present though their volume was less; these vessels had no wall. Lastly, quite at the periphery of the tumour were found hypertrophied papillæ covered by a stratified pavement epithelium. This hypertrophy of the papillæ seems to be secondary and accessory.

To sum up, it seems that there is here simply an abnormal appearance of erectile tissue in a region where, in the male, it is usually developed, though such is not the case in the female. Attempts at micturition, no doubt, contribute to the formation of pedicles for the tumours.

There are some cases in which the tumour is rather formed by prolapsed mucous membrane than by distinct polypi. I do not think that this prolapse of the urethral mucous membrane is essentially different from the polypoid formations, for it always coincides with a considerable increase of vascularity. It is only a question of degree between these cases and the preceding, but the general relaxation of the mucous membrane due to an idiosyncrasy or a general weakness here plays an important part.†

* Jondeau. On polypoid vascular tumours of the meatus urinarius in the female. Thesis, Paris, 1888.

† Tavignot. Hernia of the urethral mucous membrane (*Examineur méd.*, 1842, pp. 78 and 85).—J. Patron. On eversion of the urethral and of the vesical mucous membranes (*Arch. gén. de méd.*, 1857, 5th series, vol. 10, p. 549).—Guersant. *Bull. de therap.*, 1866, vol. 71, p. 807.—Rizzoli. On the excrescences and tumours that develop inside the urethra and at its orifice, in the female, *Trans. Galex., Brussels*, 1875.—Blum. On diseases of the female urethra (*Arch. gén. de méd.*, 1877, 6th series, vol. 80, p. 809).

Ætiology.—This affection is found with a fair amount of frequency in little girls. Larcher* and Dollez† have collected many examples of it. Benicke and Ruge‡ have seen prolapse of the urethral mucous membrane in children of from 7 to 11 years of age. Nevertheless the condition is most commonly seen about the middle of life. It is seen also in old women; a patient of Trélat's was 75 years of age. All causes of local irritation of the meatus urinarius, congestion of the pelvic organs, inflammation of the urinary tract in adults, debility and general ill health in children, favour its occurrence. §

Symptoms.—In order to get a good view of the polypi, the nymphæ must be separated and the urethra must be pressed upon by means of a finger introduced into the vagina in such a way as to bring outside the meatus the small polypus that may be hidden within it. They vary in size, and may be between that of a pin's head and that of a walnut. || I removed one from an old woman of the size and appearance of a raspberry. It is possible for the whole circumference of the urethra to be projecting, and form a circular prolapse comparable to certain herniæ of the rectal mucous membrane produced by piles. The most common spot from which polypi arise is the lower portion of the urethral meatus at the position of the tongue-shaped projection that I have mentioned as a fairly frequent normal arrangement. As a rule, the base of origin is large; but there may be a pedicle, or rather they may be constricted close to their insertion.

They are port-wine or violet in colour; they become pale and diminish somewhat in size on pressure. Their surface is smooth, but they become excoriated very easily, and then bleed profusely. The prolapsed mucous membrane forms a cylindrical tumour, which occupies the situation of the meatus, and at its summit presents a crevice that is sometimes difficult to discover. It can rarely be reduced. These tumours cause pain spontaneously,

* Larcher. On polypi in young girls. Thesis, Paris, 1834.

† Dollez. Polypi in young girls. Thesis, Paris, 1866.

‡ Benicke and Ruge. Obst. and Gyn. Soc., Berlin, Jan. 24, 1890 (Centr. f. Gyn., 1890, p. 165).

§ Terrillon. Polypoid excrescences of the urethra, symptomatic of tubercular disease of the female urinary organs (Progrès méd., 1886, pp. 101, 124, and 143). This lesion is in this particular case in no way pathognomonic, and has not the value that the author attributes to it.

|| P. Petit (Bull. Soc. Anat., July, 1889, p. 468) saw a case of a polypus as large as a walnut. Histological examination led him to define it as a cavernous angioma.

and during micturition or coitus, and may be the cause of one kind of vaginismus.* Sometimes crises of dysuria and of retention of urine occur as the result of reflex action.

Diagnosis.—Symptoms of pain, in the absence of a sufficiently careful local examination, might make the surgeon believe that it was a case of cystitis, of vaginismus, or of metritis. It is impossible from the characters of the tumour to confuse it with an epithelioma. With regard to prolapse of the urethral mucous membrane, it is not an essentially distinct lesion; it is the diffuse and less vascular form of a lesion, of which polypus is the circumscribed form.†

Treatment.—When the tumour has a sufficiently definite pedicle, it may be made to slough off by ligature of its base with a fine elastic ligature. But the simplest treatment, which can be carried out painlessly after simply painting the part with a solution of cocain, is excision followed by cauterisation with the thermo-cautery. There is then no reason to fear the hæmorrhage, which may be troublesome if a cutting instrument be used alone. With regard to constriction of the meatus it is in no way to be feared if care be taken not to cauterise the whole of its circumference, which is quite unnecessary even when the tumour formed by the prolapse of the mucous membrane occupies its whole extent. Removal of two segments and their cauterisation will be sufficient even then to bring about recovery by extension of the fibrotic process, as occurs in the case of hæmorrhoids in the rectum. In case of hæmorrhage, it will be easily mastered by stitching up with catgut.

CANCER OF THE VULVA.

Pathological anatomy.—Primary cancer of the vulva is rare, particularly if it be compared with cancer of the uterus. Out of 7,479 women who had cancer, Gurtl found cancer of the vulva 72 times;‡ or very nearly in 1 per cent. of the cases.

* Bouloumié. *Union méd.*, 1880, 8rd series, vol. 30, pp. 51 and 85.

† The so-called "hernia of the vesical mucous membrane" across the urethra has been admitted from some old and very questionable cases collected by Paton. *Loc. cit.*—Consult on this question: Francis Villar. On prolapse of the urethral mucous membrane in the female (*France méd.*, 1888, vol. 2, p. 1709 and foll.).

‡ Cf. P. Zweifel. *Die Krankh. d. äusseren weibl. Genitalien*, &c. (*Deut. Chir.*, Stuttgart, 1885, *Lief.* 61, p. 88).

But even this proportion seems too high, and probably many of these were secondary cancers.

Cancer of the external generative organs of the female is of several different histological and anatomical kinds.

Of it, from a histological point of view, may be distinguished: epithelioma, either squamous or columnar; sarcoma and its melanotic variety. From a topographical point of view two different types may also be distinguished, according as the new growth develops about the nymphæ and the clitoris (cancer of the vestibule), or starts from the meatus urinarius, along which it infiltrates around the urethra (peri-urethral cancer).

In epithelioma there is nothing particular from a histological point of view, and I refer the reader to the description and illustrations that were given when dealing with cancer of the uterus. It usually begins in the sulcus between the lesser and greater lips, more rarely in the clitoris* or meatus urinarius,† under the appearance of nodules continuous with the skin, and covered by thickened layers of epithelium. These squamæ are sometimes of old formation, older than the new growth, and indicate a vulvar psoriasis which has favoured the development of the cancer. L. Mayer‡ was the first to report several cases of this. Since then examples of it have been given by other writers.§ Later the nodules ulcerate, and the disease extends far into the neighbouring parts. There is, however, no tendency for it to invade the vagina, except in cases of cancer first developed in the neighbourhood of the meatus urinarius, which seems to extend all along the canal, and may thus affect the anterior vaginal wall. The inguinal lymphatic glands very soon become affected.

Sarcoma of the vulva may exist unmixed (Mayer) as myxo-sarcoma,|| but as a rule it is of the melanotic variety, or melano-sarcoma. In a case of Taylor's,¶ the small fusiform cells were

* J. Dauriac. On primary cancer of the clitoridean region. Thesis, Paris, 1888.

† L. Soullier. Primary cancer of the meatus urinarius in the female. Thesis, Paris, 1889.

‡ L. Mayer. Beiträge zur kenntniss der malignen Geschwülste der äusseren Genitalien (Monatschr. f. Gyn., Oct., 1868, vol. 32, p. 244).

§ Jousin. France méd., 1882, vol. 1, p. 673.—P. Reclus. Gaz. des hôp., 1888, No. 74, p. 685.

|| Hunter Robb. Myxo-sarcoma of the clitoris (Johns Hopkins Hospital Reports, 1890, vol. 2, p. 231).

¶ R. W. Taylor. Primary melanotic sarcoma of the vulva. Trans. by Labusquière

filled with a brownish pigment; in a case of Terrillon's the cells were round and pigmented, and, in addition, blackish granules could be discovered in the blood and in the urine.

Ætiology.—It is in patients from 40 to 60 years of age that malignant disease of the vulva is most commonly seen, but it has been known to exist in early life. De Saint-Germain operated on a little girl aged 5 years;* Arnott† cites the case of a young woman aged 20. On the other hand several cases are known of its occurrence in old women.

I have already mentioned, in the preceding paragraph, the predisposing influence of psoriasis. Atchinson has advanced the view that old syphilitic lesions are of an important ætiological value, but the fact seems doubtful.

Symptoms.—The cancerous nodules may long be unperceived, and the first symptom be constituted by vulvar pruritus; it is sometimes very intense and greatly distresses the patient; it occurs in crises separated by periods of relative calm. Slight sanguinolent discharge of fœtid smell makes its appearance as soon as the tumour is excoriated. The tumour at first looks like a wart, is about as large as a Spanish nut, is hard, tuberculated, and sessile or slightly pediculated. When the nodules are multiple and confluent, the whole region may be of wooden consistency, as in cancer *en cuirasse* of the breast, and the vaginal orifice may be narrowed; the meatus urinarius in the periurethral variety is also more or less blocked up. By vaginal examination the urethral canal is then felt to be transformed into a hard cylinder. The ulceration that occurs has uneven and precipitous edges covered by epidermic scales or crusts coming from solidification of the products of secretion; in its neighbourhood the skin, infiltrated by hard œdema, has the appearance and consistency of orange-peel. The hair has been known to fall out completely and to leave the vulva absolutely bare. The secretion of the ulceration is sanious and puriform; hæmorrhage is rare. The inguinal glands become swollen, and

Ann. de Gyn., June-July, 1889, vol. 81, p. 401, and vol. 82, p. 30.—Cf. also E. Göth. Pigment-sarcom der äusseren Genitalien (Centr. f. Gyn., 1881, p. 473).—O. J. Müller. Zur Kasuist. der Neubildungen an den äusseren weibl. Genitalien (Berl. klin. Woch., 1881, No. 81, p. 446).—Terrillon. Generalised melanosis commencing at one of the nymphæ (Ann. de Gyn., July, 1886, vol. 26, p. 1).

* Maurel. On primary epithelioma of the vulva. Thesis, Paris, 1888.

† Arnott. Trans. Path. Soc. Lond., 1873, vol. 24, p. 157.

soon all the signs of cancerous cachexia make their appearance; generalisation may take place in various viscera, and death may be hastened on by some complication, such as phlebitis or pleurisy. Towards the last the rectum and bladder are invaded by extension of the disease, and then the pain produced by the cystitis and proctitis becomes very acute.

Progress. Prognosis.—The latent period, or period of simple pruritus, may last for some length of time. But as soon as the growth begins to ulcerate, symptoms follow upon one another very rapidly. In melanotic sarcoma the progress is quite as rapid. As a rule death supervenes at the end of two or three years. Cases in which the disease lasted 10 and 20 years (Deschamps)* are of doubtful diagnosis. Cornil's† case, in which the tumour formed by a columnar epithelioma was partially eliminated and replaced by a cicatrix, seems, clinically, as if it ought to be classed with lupus of the vulva, although the microscope showed that it was lobulated epithelioma.

Diagnosis.—Papillary vegetations of the vulva are not in the least like cancer; the same may be said of polypus of the meatus urinarius. The absence of ulceration is here an absolute criterion.

Infecting chancre appears as a superficial ulceration, or a papular eroded prominence with very little discharge. The early enlargement of the lymphatic glands in clusters, which accompanies it, and the appearance of other specific manifestations will clear up the diagnosis.

Papulo-erosive syphilides are multiple, flattened, and formed of a kind of rounded plate resembling a small pastille placed on the integument,‡ and varying in size from that of a lentil to that of a shilling; their surface is denuded, moist, and secreting like that of a blister; they disappear very rapidly under the influence of local and general treatment, which may be used, if necessary, as a touch-stone.

When the papules are confluent and united by their edges, they may form plates from 6 to 8 cm. across, covering the whole of the vulvar region and encroaching upon the perinæum; this has been called "syphilides en nappe." At the first glance this

* Deschamps. Arch. de tocol., 1885, p. 120.

† Cornil. Bull. Soc. Anat., 1874, p. 237.

‡ Billoir. Contrib. to the study of vaginal syphilis. Thesis, Paris, 1890.

lesion distantly recalls the complete infiltration of the dermis by cancerous nodules that occurs in certain cancers *en cuirasse*. But a somewhat more careful examination will very quickly cause the characters of the syphilitic papule to be recognised. The enormous vegetations of papulo-erosive syphilides (Fournier) moreover only appear to be malignant to an inexperienced practitioner.

Simple chancre runs an acute course, does not rest upon any indurated surface, and is surrounded by healthy skin; the ulceration is composed of several small wounds in various degrees of evolution; for, to use Ricord's picturesque description, "the soft chancre lives *en famille*, surrounded by its progeny."

Lupus of the vulva presents the twofold character of ulceration and of hypertrophy, the latter being often the predominant characteristic. This affection runs, so to speak, an undecided course, destruction alternating with reparation, and this is easily recognised by examining the cicatrices and the fibrous bands that are to be seen on the edges of the ulcer. Its contour is more sinuous than that of cancer, is arranged in layers, and has a more marked tendency to spread outwards towards the perinæum and the groins; often at the bottom of the irregularities is seen a pink, yellow, or reddish bed covered by a cicatricial cuticle. Nothing comparable is seen in the case of cancer, in which the destructive course is continuous. Enlargement of the lymphatic glands, absent or but little marked in lupus, very soon makes its appearance in ulcerating cancer.

Treatment.—Complete extirpation of the disease is the only means of arresting its progress; this removal it has been recommended to carry out with the thermo-cautery, so as to avoid bleeding. But by proceeding quickly with the knife and scissors and using forcipressure forceps the loss of blood may be made insignificant. Now there is every advantage in obtaining a wound that one can unite immediately by means of sutures. I obtained thus complete primary cicatrization of a very large surface produced by the dissection of a mass of cancer that had destroyed the vestibule and the greater part of the labia minora. Very great care must be taken to restore the meatus urinarius by perfect apposition of its mucous coats. In cases of peri-urethral cancer, for the dissection the surgeon

will gain assistance from the introduction of a sound into the canal, and it may be necessary to follow the new growth right up to the neck of the bladder. If there are any enlarged glands they should be removed. Nevertheless it must be borne in mind that recurrence cannot long be warded off.

In cases in which the disease is too extensive for removal, the surgeon must have recourse to palliative measures. He must pay particular attention to combating those troubles which most distress the patient, *e.g.*, the ichorous discharge, the foetid odour, and the irritation of neighbouring parts. Frequent washing with antiseptic and disinfecting solutions should be ordered, and iodoform gauze dressings should be pushed gently into the ulcerations and frequently renewed. The patient should also be directed to anoint the skin of the groins and the internal surfaces of the thighs with boracic vaseline, so as to prevent the erythema produced by the irritating leucorrhœa.

Perhaps in certain cases Kraske's * operation might be resorted to. He has proposed to cover cancerous ulcers beyond the reach of extirpation with healthy skin, so as to make their course slower and their symptoms less painful. For this purpose the surface to be covered must be cleaned as much as possible by scraping; then proceeding, particularly by splitting of the edges, followed by sliding of the flaps thus obtained, and if necessary cutting flaps that may be turned upon their fixed extremity, the surface freshened by the curette would be covered as with a bridge by healthy skin.

* P. Kraske. *Munch. med. Woch.*, 1889, No. 1, p. 1.

CHAPTER V.

CYSTS AND ABSCESES OF BARTHOLIN'S GLANDS.

General ætiology and pathogenesis.—Cysts. Symptoms. Superficial and deep cysts. Diagnosis from: hydrocele; irreducible epiplocele and enterocoele; herniated ovary. Treatment.—Abscess. Symptoms. Fistula. Chronic inflammation. Diagnosis from: fœcal abscess; cellulitis of the labium majus; boils; simple chancre. Treatment. Incision. Extirpation of the gland.

General ætiology and pathogenesis.—The glands of Bartholin * which Huguier proposed to denominate “vulvo-vaginal,” have also been designated by the names of “Duverney’s glands,” and Cowper’s glands: the last-mentioned name has the advantage of showing their analogy with the glands in the male known by the same name. They are as large as a haricot bean, and are situated somewhat deeply on the internal surface of the labia majora, where they may be felt in thin women. Their excretory duct, about 2 cm. in length, opens immediately in front of the hymen, about the middle of the height of the vulvar orifice; it will admit the canula of a Pravaz syringe.

The pathology of these glands was, so to speak, formed by Huguier.† Since then but little has been added to his description, but it has been recognised that all the morbid conditions to which these glands are liable, inflammatory or cystic, have probably only one origin, viz., gonorrhœa.‡ Breton§ was the first to show that this disease may long remain localised to the excretory duct of the gland after having abandoned the vagina, and that it comes forth from them afresh to cause a new return of the evil symptoms. Zeissl|| has confirmed these facts. Suppuration of

* G. Bartholin. *De ovarii mulierum et generationis historia*, Leyden, 1675.—J.-G. Duverney (*Mém. de l’Acad. des Sciences*, 1701, p. 184) had only studied them previously on cows.

† Huguier. *Mém. de l’Acad. de méd.*, 1850, vol. 15, p. 527;—*Journ. des conn. méd.-chir.*, 1852, Nos. 6 and 8, pp. 141 and 197;—*Ann. des sciences natur.*, April, 1850, 3rd series, vol. 18, p. 289.

‡ Säger, cited by R. Labusquière. *Ann. de Gyn.*, Feb., 1890, vol. 38, p. 136.

§ Breton. *On bartholinitis*. Thesis, Strasburg, 1861.

|| Zeissl. *Allg. Wien. med. Zeit.*, 1865, Nos. 45 and 46, pp. 265 and 273.

the excretory duct is the rule in vaginitis, and it is easy to convince oneself of this by pressing upon them after having wiped the part thoroughly dry: a little drop of pus trickles through the duct. Its orifice is moreover surrounded by a purplish-red circle as large as a lentil, and recalling the bite of a flea, which Sanger has called the gonorrhoeal macula. In order to cure this inflammation of the canal, the surgeon must slit it up with Weber's knife that is used for slitting up the canaliculus of the lachrymal apparatus, and touch it with a nitrate of silver pencil, or with a weak (2 per cent.) solution of chloride of zinc.

Intense infection extending to all or some of the acini of the gland causes abscess; obliteration or narrowing of the excretory duct gives rise to the formation of cysts, amongst which have been somewhat arbitrarily distinguished, without real anatomical proof, cysts of the excretory duct, more superficial, smaller, and more transparent, and cysts in the gland itself. These expressions are as little justified as that of "abscess of the excretory duct," applied to simple suppuration therein, of which I have spoken as the initial phenomenon of all these lesions.

CYSTS OF BARTHOLIN'S GLANDS.

Symptoms.—The sac may be single or multilocular. It is formed at the expense of the whole of the gland, or simply of one of its lobules, the remainder of its acini being pushed on one side. It is oval in shape, and has a smooth surface; it is rarely transparent. The contents are viscid, colourless, or of a more or less deep shade of yellow, sometimes mixed with blood, and of the colour of chocolate. The cyst varies in size from that of a walnut to that of a goose's egg. It is usually unilateral, is most frequently found on the left side, and is elongated in the axis of the labium majus, of which it occupies the posterior half, being situated more near to the mucous than to the cutaneous surface. On pressure it is elastic, and can be depressed, rather than presenting fluctuation.

These cysts cause a certain amount of inconvenience during walking, and particularly during coitus. They have a marked tendency to become inflamed and suppurate.

All writers since Huguier have distinguished two varieties of cysts of Bartholin's glands under the somewhat arbitrary names of "cysts of the excretory duct" and "cysts of the gland itself." In the absence of demonstrative dissection we are completely in the dark as to the relative parts played by the various portions of the gland in the formation of the sac. But from a clinical point of view, we know that there exist two very different types of the disease.

In the so-called cysts of the excretory duct, which it will be better to denominate quite simply "superficial cysts," the tumour is generally smaller, as large as a Spanish nut or a walnut. It



Fig 464.—Cyst of Bartholin's gland.
(A catheter is introduced into the urethra.)

is situated at the base of the labium minus, which it unfolds, projects on the vaginal mucous membrane, and appears to be placed immediately beneath the mucous membrane, to which it is not attached; it may frequently be seen to be translucent. The opening of the duct has, in some cases, remained patent; a fine bougie may be introduced into it, or even on pressure the very viscid contents may be made to exude. It seems, therefore, that in this case alteration in the quality of the secretion has

played a part quite as important as temporary obstruction or constriction of the duct in leading to the formation of the cyst.

In the so-called cysts of the gland, which I should prefer to call "deep cysts," the tumour, usually of larger size, is situated behind the labium majus, between the entrance of the vagina and the ascending ramus of the ischium, and raises up both the labium majus and the labium minus. In this variety the duct is not patent and the contents are frequently coloured by old extravasations of blood. The case reported by Hoening,* in which the tumour reached into the pelvis, seems to me as if it ought not to be classed along with cysts of the labium majus,

* Hoening. *Monatschr. f. Geb.*, 1869, vol. 34, p. 130.

but with cysts of the vagina; this cyst, which no doubt was of Wolffian origin, had developed at the entrance of the vagina, and in consequence encroached upon the labium majus.

Diagnosis.—Reducible tumours ought first of all to be eliminated. The surgeon then ought to ask himself whether the tumour is solid or liquid. Fluctuation and transparency cannot here, as in the case of collections of fluid in the scrotum, indicate clearly the liquid and serous nature of the contents; transparency, except in exceptional cases, is wanting in deep cysts of the labia majora. With regard to fluctuation it may also be wanting if the tumour be very tense, or may be simulated by partial softening of a solid tumour, for example, a fibroma.* In a doubtful case puncture with an aspirating needle will clear up the difficulty, if the surgeon do not prefer to wait until the moment at which the exploratory incision which will form the first stage in extirpation, the treatment in either case, is made.

After having ascertained that the tumour has liquid contents, its exact position must be a little further defined. Hydrocele in the female, or cysts of the labium majus, independent of Bartholin's gland, which have given rise to so much theoretical discussion,† rather occupy the upper half of the labium. These collections of fluid, which may be either serum or blood (see the chapter on tumours of the round ligament), from a clinical point of view reduce themselves to a small number of varieties. 1. Small cysts as large as a Spanish nut or an almond, which may penetrate into a more or less dilated inguinal canal, effect an exit from it, and even return completely into the abdominal cavity under slight pressure, but re-appear immediately the finger is removed; these are saccular cysts, or unoccupied and obliterated hernial sacs, filled with fluid. 2. Larger irreducible cysts lodged in the upper portion of the labium majus, and containing a serous or brownish and blood-stained fluid which has caused them to receive the name of hæmatoceles; they are sometimes provided with a pedicle, which is continued into the inguinal canal. According to some writers these are hydroceles or cysts of the canal of

* Odebrecht. Berl. Obst. and Gyn. Soc., Jan. 24, 1890 (Centr. f. Gyn., 1890, No. 10, p. 165).

† See on this subject Picqué. Internat. encycl. of Surg., French edit., vol. 7, p. 787.—Koppe. Zur Genese und klin. Deutung der Vulvarcysten (Centr. f. Gyn., 1887, No. 40, p. 639).—Hennig. Ueber Hydrocele muliebris (Arch. f. Gyn., 1885, vol. 25, p. 103).

Nück;* according to others they are cysts originating in the substance itself of the round ligament;† according to others, again, they are also saccular cysts in old unoccupied hernial sacs. 3. Very exceptionally a serous cyst may be developed in front of a hernia kept up by a truss, being a kind of bursa or hygroma caused by friction, but the practitioner hardly has to reckon with curiosities such as these.

There remain solid tumours, and first of all amongst these there is irreducible epiplocele. The doughy lobulated consistency may have already caused it to be suspected; the best sign is furnished by searching for the pedicle. In order to feel it the tumour must be drawn as far downwards as possible, while the finger is placed over the ring. If at this spot not the slightest pedicle is felt connecting the tumour with the interior of the abdomen, it is not a hernia. This diagnosis will be confirmed if impulse on coughing be not perceived either at the ring or in the tumour. With regard to irreducible enteroceles they are very rare in this region, and their resonance on percussion would be characteristic. The presence of fluid in the sac might however cause difficulty in diagnosis. One must also remember that a hernia may co-exist with a tumour of the labium, and this would enormously increase the difficulties of diagnosis. A herniated ovary has been known to descend right into the labium majus, although as a rule it is arrested in the inguinal canal. Ordinarily the gland has preserved its normal form and sensibility, and pressure upon the anterior surface of the uterus through the vagina leads to a retrograde movement of the tumour. But diagnosis becomes almost impossible if there exists around a more or less atrophied ovary which is pushed against the walls of the sac a layer of fluid imprisoned in the hernial sac.‡

Treatment.—The surgeon must not content himself with evacuating the fluid contained in the cyst, for it would very soon be reproduced. It is necessary to profoundly modify, destroy, or extirpate the sac. Various procedures have been suggested for this purpose. The injection of ten or twelve

* R. Koppe. *Hæmatocele processus vaginalis peritonei* (Centr. f. Gyn., 1886, No. 12, p. 179).

† S. Gottschalk. *Hæmatoma ligamenti rotundi* (Centr. f. Gyn., 1887, No. 21, p. 329).—E. H. Weber in point of fact holds an opposite opinion to that held by Kölliker, and asserts that the round ligament is hollow in the fetus.

‡ P. Tillaux. *Treatise on clinical surgery*, Paris, 1889, vol. 2, p. 472.

drops of a 10 per cent. solution of chloride of zinc by means of a Pravaz syringe, with emptying the cyst, and after simple aspiration of an amount equivalent to the amount to be injected, has proved successful.* But the inflammation thus induced may be very severe, and may lead to suppuration. Free incision followed by plugging of the sac with iodoform gauze until it exfoliates is a certain method, but takes too long a time. Extirpation of the cyst, followed by immediate union of the wound with superposed layers of catgut stitches, is much to be preferred. In order to facilitate dissection, which would be rendered very tiresome by the least scratch that opened the sac, I have applied to this operation my method of preliminary injection of spermaceti.† The cyst is first of all punctured with a hydrocele trocar, is emptied, washed out with warm water in order to remove all the viscid fluid, then it is filled with spermaceti melted in a water bath at a relatively low temperature. When the sac is thus distended, it is surrounded with pounded ice, and after a few minutes a hard mass is obtained which it is very easy to extirpate rapidly, under the anaesthesia produced by the cold and by injections of cocain.

ABSCESS OF BARTHOLIN'S GLANDS.

Symptoms.—Suppuration of the glands of Bartholin may take place at the very outset, or may be secondary to inflammation of the cyst. Swelling and œdema around the gland are considerable, and extend to the whole posterior portion of the vulvar region, or even to the anus; the pain is sharp and lancinating; there is always a certain amount of fever, and sometimes retention of urine. Fluctuation first becomes apparent on the inner surface of the labium majus, and the collection of pus opens at one or more spots beneath the opening of the excretory duct. There is a large amount of pus, and it is usually foetid, as it is whenever formed in the neighbourhood of any of the natural cavities of the body. The gonococcus has been found in it.

Long after the inflammatory storm has passed off fistulæ

* E. Duvernoy. Treatment of cysts of the vulvo-vaginal glands by injections of chloride of zinc (Ann. de Gyn., 1880, vol. 13, p. 251).

† S. Pozzi. Bull. et Mém. de la Soc. de chir., 1878, p. 715.

persist, sometimes opening into distinct foci, which correspond to the various lobules of the gland ("abcès granuleux" of Huguier). But generally the whole of the gland and the circumjacent cellular tissue has been invaded as a whole by the suppurative process ("abcès parenchymateux" of Huguier), and the multiple fistulæ that result from the evacuation terminate in a common burrow. Exceptionally they may open about the perinæum or the rectum, and give rise to recto-vulvar fistulæ.* If the skin is destroyed at this spot there is a large ulceration on the inner surface of the labium majus.

To this acute variety may succeed a chronic inflammation of the vulvo-vaginal gland, or sometimes it becomes established from the first. It is a very distinct clinical variety, which has been well described by Hamonic† and Fauvel‡ as an obstinate stronghold of gonorrhœa. Huguier had already clearly indicated it under the name of "purulent hyper-secretion." In point of fact there are then neither signs of inflammation nor a distinct tumour, but simple hypertrophic induration of the gland, the excretory duct of which gives exit, under pressure, to greenish or milky pus, which also escapes by the fistulous openings that have resulted from the spontaneous evacuation. It is one of the last refuges of gonorrhœa, a frequent and little suspected source of infection for the male, and a site whence ascending infection of the generative canal may also start after the woman has been delivered or has aborted.

Diagnosis.—A fæcal abscess originating at the margin of the anus, and propagated to the posterior portion of the labium majus, would be distinguished by the greater intensity of the local symptoms at the side of the anus, and by its greater diffusion.

Cellulitis of the labium majus, which is generally of lymphangitic origin, and the evolution of which it has not been able to follow, is rather situated on the external and cutaneous surface, whereas abscess of the vulvo-vaginal gland projects on the internal and mucous surface.

Boils are situated in the skin, have an acuminate appearance, and a special evolution.

* Chevalieras, cited by St. Bonnet. Cysts and abscess of the vulvo-vaginal glands (*Gaz. des hôp.*, June 16, 1888, p. 637).

† Hamonic. *Ann. de dermat.*, 1888, p. 427.

‡ Fauvel. Chronic inflammation and fistula of the vulvo-vaginal gland. *Thesis*, Paris, 1886;—*Arch. de tocol.*, 1886, p. 337.

The ulceration that may result from partial sloughing of the wall of the abscess must not be confounded with the ulceration caused by a simple chancre; the history will be sufficient for the avoidance of mistakes.

Treatment.—The sac must be freely incised as soon as the first symptoms of inflammation make their appearance; the knife must be thrust in at the junction of the skin and the mucous membrane, just inside the free edge of the labium majus; care must be taken to leave no sinus or cul-de-sac, but they must be thoroughly laid open; the insertion of drainage tubes would be quite insufficient. It is a good practice after incision immediately to extirpate the gland from the bottom of the wound by rapidly excising the whole of the internal surface of the sac with curved scissors. The wound is then to be washed out with a strong solution of carbolic acid, and plugged with iodoform gauze. If old fistulæ, the result of spontaneous evacuation, exist, the surgeon should also proceed to extirpate the gland, which is the only method of curing the never-failing suppuration of these fistulæ, which are incessantly closing up and breaking down. The wound might then be immediately united by means of a hidden catgut suture in superposed layers.

CHAPTER VI.

PRURITUS VULVÆ. COCCYGODYNIA.*

Pruritus vulvæ. Definition. Ætiology. Symptoms. Diagnosis. Prognosis. Treatment. — Coccygodynia. Definition. Ætiology. Symptoms. Electricity. Myotomy. Extirpation of the coccyx.

PRURITUS VULVÆ.

Definition.—The sensation of itching, or of burning, which accompanies eruptions on the vulva, or its irritation by the abundant leucorrhœa of vaginitis, of metritis, and of cancer, or again, and particularly in children, by thread-worms, constitutes a symptom and not a disease. The point that characterises what may be called idiopathic vulvar pruritus is the absence of any lesion to explain an intolerable sensation, which uncontrollably forces patients to scratch themselves even to the production of excoriations.

Ætiology.—In the absence of all apparent cause, certain writers have thought fit to invoke a central origin.†

The rheumatic diathesis, incriminated by Guéneau de Mussy, and the influence of which appears to be indubitable, does not seem to cause any anatomical modification of the dermis appreciable on clinical examination.

Side by side with the numbers of cases in which there exists no lesion of the generative organs, there are others in which an affection of the uterus, or even, it has been said, of the ovaries may be present; they seem to act by a kind of reflex action on the sensibility of the vulva. It is thus that some vesical calculi lead to intense itching at the glans penis.

* I consider coccygodynia in the same chapter as pruritus vulvæ, although it does not constitute a disease of the vulva; but this course has seemed to me to be preferable to making a special BOOK for the description of this inconsiderable affection. An approximation with pruritus vulvæ, moreover, though inexact from a topographical point of view, is quite legitimate from a nosological point of view.

† H. Beigel. *Krankh. des weibl. Geschlechts*, 1875, vol. 2, p. 731.

Diabetes* is one of the most obstinate causes; does it act by the irritation of the urine which flows over the vulva, by a modification of the cutaneous secretions, or by some action of the central nervous system? The question is a difficult one to decide. Pregnancy favours the appearance of pruritus, and it appears especially at the commencement or the end of gestation, when the congestion of the generative organs is the greatest.

Symptoms.—The itching sensation may be continuous, or intermittent when it only re-appears at certain times, particularly at night when the patient is warm in bed. Cases have been cited in which it only appeared at intervals of two or three days. Many women only suffer at the menstrual periods; others during each pregnancy. The pruritus usually is situated over a large surface, including the clitoris, the mons veneris, and the labia majora. One case is known in which the clitoris alone was affected.† Patients tear themselves with scratching, and these excoriations themselves become a fresh source of smarting. Lastly, the rubbing of the vulva leads to onanism; and sometimes from this exaggerated excitation of the nervous system profound disorders of the general health and of the mental condition occur, which may end in pernicious anæmia or in insanity.

Diagnosis.—Particular attention must be given to making out whether any cause whatsoever of local irritation exists: the condition of the uterus and appendages must be examined carefully; the condition of the urinary tract and the rectum must be considered, and diabetes must be borne in mind.

Prognosis.—The prognosis varies greatly, and is subordinated to the probable cause of the symptom. The most obstinate cases are those in which the ætiology is obscure.

Treatment.—First of all, any concomitant disease which may be suspected to be the cause must be treated. The general nutrition of patients who are herpetic or arthritic must be modified by a suitable regimen: abstinence from alcoholic beverages, spices, fish, shell-fish, &c.; slightly alkaline drinks, frequent laxatives, prolonged baths; arsenic should also be exhibited internally. If diabetes be present suitable treatment must be instituted.

* F. Winckel. Deutsche Zeitschr. f. prakt. Med., 1876, No. 1, p. 2.

† Küchenmeister. Pruritus clitoridis (Oest. Zeitschr. f. prakt. Heilk., Nov. 7, 1875).

Locally any eruption that may exist should be treated. The most diverse topical applications have been recommended for idiopathic pruritus; the pain appears to be relieved best by painting with a ten per cent. solution of cocain. Slight cauterisation with nitrate of silver or with strong carbolic solution, chloroform water, Van Swieten's solution,* menthol,† &c., have been recommended. Internally all antispasmodics, and particularly bromide of potassium and cannabis indica, will be useful. Schröder and Löhlein‡ have obtained, the former four successes, the latter one success, by excision of the portions of the mucous membrane or of the skin where the pruritus was localised (histological examination revealed to Schröder the existence of no lesion).

COCYGDYNIA.

Definition.—Under this name is designated an intense pain, localised to the coccyx, which occurs almost exclusively in women, and is generally associated with disease of the generative apparatus. It was first noticed by Nott,§ and regarded as a neuralgia of the coccyx. But it was Simpson|| who first published a complete description of it and gave it a name. Scanzoni¶ devoted several important papers to its consideration, and little has since been added to his work. In the majority of cases, and one might say in typical cases, there is no appreciable lesion, and it rather appears as if one had to deal with a true neuralgia. But in another class of cases, some accompanying lesion of the uterus, metritis, malposition, or a prolapse of the ovaries is discovered; these lesions, if they do not suffice to explain the localisation and the intensity of the pain, at any rate seem associated with its appearance and permanence. Lastly, in a third category of cases there are lesions of the coccyx, or of its ligaments, which here also much rather play

* Tillaux. *Loc. cit.*, p. 460.

† A. Duke. Menthol in pruritus vulvæ (B.M.J., 1888, vol. 2, p. 75).

‡ Schröder and Löhlein. Berl. Obst. and Gyn. Soc., Nov. 11, 1884 (Centr. f. Gyn., 1884, p. 804).

§ Nott. New Orleans Med. Journ., May, 1844;—Amer. Journ. of Obst., Nov., 1868, vol. 1, p. 243.

|| J. Simpson. Med. Times and Gaz., July 2, 1859, vol. 2, p. 7.

¶ Scanzoni. Würzburg. med. Zeitschr., 1861, vol. 2, p. 4;—Lehrbuch der Frauenkr., 1867, p. 825.

the part of an occasional cause than of an efficient cause in originating the extreme pain. Amongst this number have been noted abnormal mobility of the bone, due perhaps to a kind of strain, or of luxation during a tedious labour, ankylosis, extreme length, or osteitis (Nott).

The influence of parturition seems to be beyond question. Scanzoni, out of 34 cases of his own that he collected, has only met with it in women who had borne children; in 9 of them the pain commenced during labour, and 5 had been delivered with forceps; it is natural to suppose that in these cases there had been luxation of the coccyx. Nevertheless it must be remarked that Hyrtl* met with anatomical traces of dislocation with secondary ankylosis in 34 out of 180 pelves that he examined with this object in view; one is bound, therefore, to admit that this lesion is not only fairly common, but also is not severely painful. It alone evidently is insufficient to explain the neuralgia, for cases of coccygodynia are incomparably less common than cases of luxation. Gräfe,† who has seen 6 cases of coccygodynia which all came on in women in whom labour had not been difficult, does not attribute any importance to the coccygeal lesion; in two of his patients the pain appeared at the end of the pregnancy, and he believes that it is caused by the pressure exerted by the head of the foetus upon the terminal portion of the sacral plexus and leading to neuritis.

Although the importance of coccygeal lesions must be reduced we cannot refuse to allow them a place amongst the ætiological factors. In a young woman seen by Zweifel the pain was dependent upon a fall that had probably fractured or dislocated the bone; it disappeared after the lapse of a year. Scanzoni in two instances noted the influence of horse-riding. Zweifel and Courty have seen this affection in virgins, and Beigel‡ in children; these last facts are quite exceptional.

Symptoms.—Pain limited to the coccyx or its immediate neighbourhood is the most important symptom. It is intense, called forth by pressure, by the movements executed in rising and in sitting down, by walking, defæcation, coitus, and exertion

* Hyrtl. *Handbuch der topogr. Anatomie*, 1871, vol. 2, p. 22.

† Gräfe. *Ein Beitrag zur Aetiologie und Therapie der Coccygodynie* (*Zeitschr. f. Geb. u. Gyn.*, 1888, vol. 15, part 2, p. 344).

‡ H. Beigel. *Loc. cit.*

of any description. Anything that gives a shock to the coccyx awakens the pain, which is sometimes so severe that Scanzoni compares it to the pain of dental neuralgia. In order to ascertain the anatomical condition of the coccyx, a finger must be introduced into the rectum, and the bone must be seized between it and the thumb; local production of anæsthesia by cocaine will be necessary.

Treatment.—The treatment of concomitant disease, in particular of retroflexion, will sometimes bring about cessation of the pain. An endeavour might be made to lessen it by hypodermic injection of 1 centigramme of cocaine. Injections of morphia and belladonna suppositories will also be of use.

When there is no lesion of the bone Gräfe recommends faradic electricity, and he has owed to it some most brilliant successes. He places one electrode on the sacrum and the other over the coccyx, and he increases the strength of the current at each sitting; three to eight sittings are sufficient. Surgical treatment alone seems capable of curing obstinate cases. With the object of preventing movement of the coccyx caused by muscular action, Simpson used to make a series of subcutaneous sections, myotomies and tenotomies, the result of which was to isolate the bone from all parts. But this operation has often proved to be untrustworthy. The best thing is to extirpate the bone, as was first done by Nott. Several successes have thus been obtained in cases which had resisted all other therapeutic agents.* I myself owe to it the complete and permanent recovery of a very stubborn case.

* Amann. Zur Behandlung der Coccygodynie (Bayer ärztl. Intelligenzbl., 1870, No. 80).—Plum. Hosp. Tid., 1870, p. 33.—Mursick. Amer. Journ. of Med. Sciences, Jan. 1874, p. 122.—Th. Moore, B.M.J., Feb. 8, 1890, p. 801. (The coccyx was in this case bent strongly backwards and projected under the skin; the patient had suffered for four years, and could neither sit down nor walk. The bone was removed and the patient recovered.)

CHAPTER VII.

WOUNDS OF THE VULVA AND VAGINA.—ACQUIRED STENOSIS AND ATRESIA.—FOREIGN BODIES.

Wounds of the vulva and vagina. *Ætiology.* Defloration. Parturition. Injury. Symptoms. Hemorrhage. Protrusion of the intestine. Diagnosis. Prognosis. Treatment.—Acquired stenosis and atresia. *Ætiology.* Parturition. Wounds caused by foreign bodies. Cauterisation. Gangrene. Lupus. Syphilitic ulceration. Pelvic suppuration. Vaginitis. Senile atrophy. Symptoms. Obstructive dysmenorrhœa. Retention-symptoms. Cicatrices. Malpositions of the uterus. Metritis. Treatment: 1. In the absence of pregnancy: section; dilatation; autoplasmic operation;—2. During pregnancy: abortion and premature labour; progressive division of the fibrous bands;—3. During labour: vaginal incision; craniotomy; Porro's operation and Cæsarian section.—Foreign bodies. *Ætiology.* Symptoms and progress. Tolerance. Calcification. Symptoms: inflammation and ulceration; pelvic suppuration; peritonitis; narrowing of the vagina; leucorrhœa; hæmorrhage. Diagnosis. Treatment.

WOUNDS OF THE VULVA AND VAGINA.

Ætiology.—Most commonly lacerations of the vulva and vagina depend upon defloration or parturition; they have also been known to occur after injuries.

Excessive violence during coitus, either during the first voluntary connection, or preceded by rape, may tear the hymen, stripping it off, so to speak, or even tearing it away almost completely; in other cases the laceration extends beyond the insertion of the membrane, towards the nymphæ or the vestibule. The vaginal wall is less commonly implicated than the vulva. Nevertheless cases have been published in which the posterior wall of the canal has been ruptured during rape. Sabin* has reported a case in which the recto-vaginal wall was ruptured from the vulva up to Douglas' pouch. Barnes† speaks of a preparation in the Museum of St. George's Hospital in which is seen a laceration of the vagina penetrating into the peritoneum;

* Sabin cited by Petit. *Art. Vagina (pathology).* *Encycl. Dict. of Med. Sciences*, 1886, p. 235.

† Barnes. *Clin. treat. on dis. of women*, French trans., Paris, 1876, p. 727.

it had been caused by coitus with an old woman whose vagina had probably undergone senile atrophy. Breisky* records a case, also attributable to senile involution, in which recovery took place.

During parturition the hymen is often ruptured, for Budin found that out of 75 primiparæ it was intact in 13 at the onset of labour.† The laceration of the hymen may then be prolonged into the perinæum (see the chapter on Ruptured Perinæum). The vagina has been ruptured during parturition by the forceps or the cephalotribe.

Amongst the surgical traumatismis in which rupture of the vagina is seen, I must mention violent manipulations for the reduction of a chronic inversion of the uterus, the extraction of large fibroids, &c. The most common accidental injuries are falls upon pointed objects, sudden and rough introduction, or prolonged sojourn of a foreign body, &c.

Symptoms.—The seat and extent of wounds of the vagina and vulva vary greatly, according to the cause that has produced them.

Hæmorrhage is sometimes very profuse in lacerations of the hymen, which may be attributed to the presence of the erectile tissue which Henle has shown to be exceptionally a constituent of this membrane. The laceration may also extend to the erectile tissue of the vagina. The hæmorrhage may be so severe as to threaten life, and even prove fatal.‡

Opening up of Douglas' pouch is accompanied by protrusion of a coil of intestine; if it is not returned, it becomes strangulated, gangrenous, and leaves, after sloughing, an ileo-vaginal fistula, when death has not been the result of the accident.§ Opening into the rectum or bladder may leave a fæcal or a urinary fistula.

Diagnosis.—Diagnosis raises some very important questions in forensic medicine. One is generally inclined to attribute all lacerations or ruptures of the vulva in children to attempts at

* Breisky. *Die Krankh. der Vagina*. (Deutsche Chir., 1886, Lief. 60, p. 89.)

† This fact does not prove absolutely that the hymen has not been ruptured previously; for it is known that lacerations of this membrane may become cicatrised (Brouardel).

‡ Aschen. *Prag. med. Woch.*, 1889, No. 8.

§ In a case published by Stanley (*Lancet*, 1839-40, vol. 1, p. 248) there persisted in the vagina an opening forming a communication between the peritoneum and this canal, in fact a peritoneo-vaginal fistula, which allowed of exit and return of the small intestine.

rape. Hoffmann* and Maschka† have made express reservations on this point, and have shown that simple manipulations may have the same effect. Now they are sometimes made with the object of extorting money from the individual who is accused of having made a criminal attempt at violation.

Prognosis.—Hæmorrhage is only serious if the woman be unable to procure help. The inflammatory and septic complications that may follow these injuries depend upon the care that has been given to dressing the wounds. It is nevertheless worthy of remark, and difficult of explanation, that very serious injuries opening up the peritoneum have been perfectly recovered from during the pre-antiseptic period, or more recently, in spite of insufficient precautions being taken against infection.‡ On the other hand, insignificant wounds, such as leech-bites, if insufficiently attended to, have been known to cause extensive suppuration.§ Lacerations of the vagina during parturition are particularly serious if there exist any cause of infection in this canal, *e.g.*, vegetations, gonorrhœa, sloughs, &c.

Treatment.—When there is abnormal narrowness of the vagina or the vulva (see the following section), one will be obliged to institute a prophylactic course of treatment during pregnancy or labour. For the treatment of the laceration itself the general lines of treatment for any traumatic lesion should be followed: arrest the hæmorrhage by ligature, forcipressure, or hæmostatic overcasting suture; sew up the wound after having returned any parts that may have protruded in consequence of the solution of continuity; lastly, render the part antiseptic. Loose packing of the vagina with iodoform gauze should follow upon suture of a wound of its walls. The parts should be gently compressed by means of a T-shaped bandage.

ACQUIRED STENOSIS AND ATRESIA.

Ætiology.—In the vast majority of cases narrowing (stenosis) and obliteration (atresia) of the vagina or of the vulva, when

* E. Hoffmann. *Lehrb. der gerichtl. Med.*, Vienna, 1877.

† Maschka. *Handbuch der gerichtl. Med.*, 1882, vol. 3, p. 164.

‡ Colombat. *Treat. on dis. of Women*, vol. 2, p. 424.—Fleury. *Ann. de Gyn.*, 1877, vol. 8, p. 457.

§ Gallois. *France Mèl.*, 1878, vol. 1, p. 773.

they are not of congenital origin, are the result of a difficult labour. When the sloughs produced by compression by the foetal head have destroyed the whole thickness of the walls, they lead directly to the formation of fæcal or urinary fistulæ. But if only a portion of the thickness of the vaginal wall has sloughed, the cicatrix which forms after separation of the slough undergoes a process of fibrous contraction. Moreover, the neighbouring parts in contact often become joined together by a true immediate secondary union.

It is possible that the cicatrix which causes the narrowing is due to an injury caused by a foreign body, which has entered with violence and positively impaled the vagina, or which has remained *in situ* for a considerable length of time, and has led to secondary ulceration, such, for example, as a forgotten pessary.* Cauterisation performed with the object of inducing abortion,† or for some surgical end,‡ sloughs due to gangrene, during some infectious disease, lupus of the vulva, syphilitic ulceration, suppuration in the true pelvis (dissecting phlegmonous peri-vaginitis), have been known as the causes of cicatricial narrowing. Vaginitis alone may, in children (Simpson)§ or in adults (Hildebrandt),|| lead to more or less extensive adhesion of the vaginal walls.

There is a rare cause of vaginal stenosis which is situated almost exclusively in the upper portion of the canal, in the neighbourhood of the cervix; it is senile atrophy. The canal becomes narrowed and funnel-shaped, and at the bottom of the cone thus formed is found with difficulty the atrophied cervix. It is sometimes difficult to distinguish cases of this kind from cicatricial or cancerous stenoses.¶ This stenosis is only seen in women who have never had sexual relations. I have seen one curious example of the condition.

Symptoms.—The cicatrices may be situated at the entrance of the vulva, when they are the result of kicks, tossing by a horned animal, impalement, a burn, or gangrene of the vulva in young

* Breisky (*loc. cit.*) mentions an example of this kind in the anatomical museum at Prague; the case was one of a woman aged 68 years who had kept her pessary in for 24 years.

† Levy. *Bibl. f. Laeger*, 1860, p. 39.

‡ E. Kennedy. *The Dublin Journ.*, 1840, vol. 16, p. 80.

§ Simpson. *Clin. lect. on diseases of women*. Edinburgh, 1872, p. 259.

|| H. Hildebrandt. *Monatschr. f. Geb.*, 1868, vol. 32, p. 128.

¶ Barnes. *Loc. cit.*, p. 727.

children. But the greater number of bands or obliterations being due to loss of substance, the result of sloughing and following on parturition, they are situated in the vagina and more deeply. The disorders which result from them come on progressively, and are sometimes long delayed by the incessant dilatation produced by conjugal relations. However, there need not be more than a very moderate permeability of the vagina to allow of coitus and to ensure also the discharge of the menstrual blood. It may therefore happen that women may be the subjects of very extensive lesions without knowing it. Nevertheless if the opening through which the catamenia escape be very narrow, there is often dysmenorrhœa of what has been called the "obstructive" type.

If the obliteration be complete (atresia), the menstrual blood collects above the obstruction and distends the vagina, completely or in part, the uterus, and even the Fallopian tubes (hæmato-colpos, hæmato-metra, hæmato-salpinx). For the consideration of this subject I refer the reader to the chapter on Accidents of Retention Dependent upon Congenital Atresia (Book XVI., Chapter III.). On the other hand, a certain number of cases have been observed in which accidental obstruction of the generative tract led to amenorrhœa, a happy circumstance which put such accidents out of the question.* Stenoses may present themselves in the form of cicatricial rings, producing a kind of diaphragm, the projection of which opposes an obstacle to the exit of the uterine secretions, which therefore collect above them. The ring is often incomplete in the shape of a crescent or of a falciform band stretched in front of the infra-vaginal cervix, which is quite hidden by it, and which is only accessible on digital examination across this membranous curtain (fig. 465). In this way certain kinds of malpositions of the uterus seem to

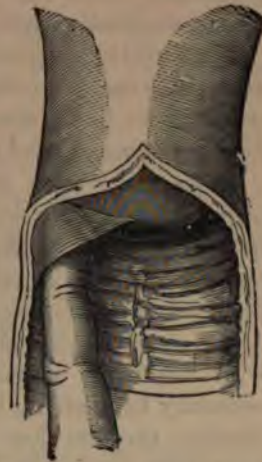


Fig. 465.—Falciform cicatricial band stretching from the vaginal wall to the cervix uteri; it is raised up by a finger. (Barnes.)

* E. Kennedy. *Loc. cit.*, p. 93.

be produced. I have seen several examples of it. There is almost always metritis present at the same time, caused no doubt by the obstacle opposed to the natural drainage of the uterine cavity. The contraction may be so great that the orifice which gives exit to the menstrual blood can only be discovered with difficulty.

The treatment of imperforate conditions or acquired atresia is similar to that for congenital atresia. The surgeon may be obliged to form an artificial vagina for the sole object of permitting coitus (see Book XVI., Chapter II.), or to remedy serious accidents of retention (see Book XVI., Chapter III.).

Cicatricial bands giving rise to simple contraction or stenosis necessitate surgical interference under three different sets of circumstances: in the absence of a gravid condition of the uterus, during pregnancy, and during labour.

1. *In the absence of pregnancy.*—It is not only with the object of facilitating sexual relations that these lesions have to be removed. They play the part of foreign bodies, which are the starting-point of reflex action, and lead to the occurrence of pain and of metrorrhagia.

The simplest method of dividing these bands is to raise them with the finger without the assistance of a speculum, but if necessary by lowering the cervix or adjacent parts by means of forceps; they are then to be divided with small cuts made with long scissors, great care being taken not to injure the vaginal wall itself.* This division may be carried out on several occasions, and may be followed by dilatation of the vagina, first of all by means of plugging with iodoform gauze, and afterwards with gutta-percha cylinders, or with Bozeman's balls that are used for dilatation of the canal in the preliminary treatment of vesico-vaginal fistula. Later, it will be well in certain cases to insert a Dumontpallier's or a Hodge's pessary, so as to separate the vaginal walls. If the surgeon find he has to deal with a very thick and very extensive mass of fibrous tissue, the best course will be to excise it completely, and then to fill up the loss of substance by an autoplasmic operation with flaps of healthy mucous membrane dissected up from the neighbouring parts.†

* Guéniot. *Arch. de tocol.*, 1886, p. 198.

† Harris (of Paterson). *Amer. Journ. of Obst.*, 1882, p. 888.—Credé. *Arch. f. Gyn.*, 1888, vol. 28, p. 259.

In any case in which there exists along with vaginal cicatrices that contract the canal a vesical or rectal fistula, the greatest care must be taken to make sure that the destruction of the contraction does not lead to enlargement of the fistula. This circumstance might even decide the surgeon to resign himself to indirect treatment of the fistula by obliteration of the vagina or colpocleisis.

2. *During pregnancy.*—Contraction or stenosis of the vagina in a pregnant woman raises some very serious questions concerning operation. The first is to know whether the surgeon ought to bring about abortion, or to induce premature labour, or simply to attempt to destroy the obstacle and allow the pregnancy to follow its course. Oldham,* in a case of this kind, successfully induced premature labour. Doherty† could not resolve upon doing this, and saw his patient succumb. Churchill‡ pronounces himself in favour of this intervention as a means of preventing rupture of the uterus and of the vagina, which have been frequent consequences of temporising. Nevertheless one must first of all feel perfectly certain that by progressive division of the cicatricial bands one cannot succeed in obtaining a sufficient degree of dilatation. Another point also must not be lost sight of, and it is that at the time of parturition the softening of the tissues often renders very dilatable cicatrices which formerly appeared inextensible.

3. *During labour.*—It may happen, however, that the surgeon is quite unaware of the condition of the vagina until he comes to deliver the woman, and that he then finds himself in presence of the obstacle. In cases in which spontaneous dilatation is manifestly impossible, Churchill, following Doherty's example, recommends vaginal incisions in spite of the risk of seeing them degenerate into ruptures and fistulæ. Afterwards, he says, if necessary craniotomy must be resorted to. The manipulations which it necessitates in a very narrow and friable vagina are not themselves without danger. The operation to be preferred is frequently that of Porro,§ as it protects the woman once for all

* Oldham. London Med. Gaz., 1849, vol. 10, p. 45.

† Doherty. The Dublin Journ., 1842, vol. 21, p. 67.

‡ Fleetwood Churchill. Pract. treatise on dis. of women, French trans. by Leblond. Paris, 1881, p. 151.

§ Porro. Della amputazione utero-ovarica come complemento di taglio cesareo. Milan, 1876.

from any fresh dangers. On that account it is to be preferred to the Cæsarian section. Porro's operation is absolutely necessary if the narrowing of the vagina is too great to allow the free flow of the lochia, so indispensable after the Cæsarian operation, and especially when, as in one of Levy's cases, the complete obliteration of the vagina had to a great extent come on during pregnancy.*

FOREIGN BODIES IN THE VAGINA.

The most various kinds of foreign bodies have been introduced, and have remained for a time in the genital canal: pessaries, sponges, tampons, reels, sheaths, pomatum-pots, phials, glasses, canulæ, pencils, hair-pins, &c. Intestinal worms and insects have also found their way into it, and have given rise to trouble.

Ætiology.—It is sometimes in play that children introduce such objects into the genital tract. But most often one has to deal with objects which have been used for masturbation, and which have slipped out of the fingers holding them and have been drawn in out of reach. Lastly, certain foreign bodies, such as broken canulæ and fragments of a glass speculum, have been overlooked and left in the vagina. It is rare for a foreign body to penetrate through the rectum or the bladder after having perforated the vaginal wall, or been the cause of its being ulcerated through.

Symptoms and course.—If the object is smooth and non-porous it may remain a long time aseptic, and be tolerated; this is what happens to metallic or hardened gum-elastic pessaries. All the same, the continuous pressure on the same point ends by causing

* If the complete obliteration of the vagina does not involve the canal to a very great extent, and forms an obstacle of medium thickness, one should have no hesitation in dividing it as if it were a frenum. This is what Professor Pinard did successfully in the case of which he was kind enough to send me an account: a young woman who had already been confined once, was brought to the Maternity department of the Lariboisière Hospital in labour; the upper part of the vagina was found completely obliterated (this woman had been giving herself daily during a whole month injections of vinegar to bring on abortion, during the third month of her pregnancy); during the period of expulsion, Professor Pinard observed that in one part the cicatricial tissue was very thin; he perforated it with the hystrometer, then dilated the orifice with his finger, and delivery took place without any difficulty; there was afterwards noticed a persistent cicatricial diaphragm, irregular in appearance, situated on a level with the original atresia.

the tissues to ulcerate, and then the foreign body works its way in and becomes, so to say, set in the part. I have seen one example of this kind, which used to be frequent, and has been mentioned by more than one author. A pessary had been forgotten and buried to a certain depth under the mucous membrane, which passed over it something like a bridge; for its removal this sort of covering had to be excised.

In other circumstances, the foreign body becomes tolerated by a special process of cure, which reminds one of that undergone by certain morbid growths, that is, calcification. Pointed objects, such as pins, are in this manner enveloped in a thick stony mass which prevents them from wounding the parts. Getschell* has observed one of these calculi, which remind one of those which form in the bladder in similar circumstances. It may be that some of what the old authors mentioned as vaginal calculi were nothing but calcified uterine fibromata, or even vesical calculi, which had ulcerated through the vaginal wall.

Should the object be a porous one it becomes infected, and may set up some suppurative inflammation or progressive ulceration, which may cause it to travel to quite a distance. A hair-pin has been removed after remaining 16 years in the vagina and producing a vesico-vaginal fistula.† I saw, in 1887, in Freund's Wards in Strasburg, a woman who had been suffering for 10 years, after an abortion brought about by the introduction of a hair-pin into the uterus through the vagina. Laparotomy disclosed a pyo-salpinx, and by the side of the suppurating cavity the pin, all eroded.

Pelvic suppuration and peritonitis have, in fact, been observed, either immediately or very late.‡

The irritation which is set up round a foreign body of a certain size may produce a circular shrinking of the vagina. Breisky§ has observed almost complete obliteration of this canal below a reel, which had, so to say, become encysted in the upper portion of the vagina.

With the exception of some rare cases, any foreign bodies sojourning in the genital canal, even when tolerated, produce a

* F. H. Getschell. *Philad. Med. Times*, July, 1873, p. 635.

† L. Atthill. *Med. Press and Circ.*, 1881, vol. 31, p. 291.

‡ Léonard. *Progrès méd.*, Sept., 1884, p. 167.

§ Breisky. *Die Krankh. der Vagina* (Deutsche Chir., Stuttgart, 1886, p. 175).

more or less abundant leucorrhœal discharge, which may become purulent and foetid, and be accompanied by hæmorrhage. The latter is much less due to ulceration of the walls of the vagina than to the diseased condition of the uterus, which has become infected by the vagina.

It may be difficult to make a diagnosis when the object is buried in the tissues or hidden by some narrowing of the parts; besides, one should never expect the patient to make any correct statements from memory. Exploration with a stylet will help the vaginal tactus; rectal tactus will frequently be of great use.

The *treatment* consists in first of all removing the foreign body, then curing any lesions it has caused.

Any small objects lying free in the culs-de-sac, such as insects, intestinal worms, seeds, &c., can be driven away without difficulty, by means of abundant irrigations through a speculum placed so as to keep the walls of the vagina wide apart. If there is any narrowing of the vagina below some hard and round object, the obstruction may be overcome by pushing the object, using the finger through the wall of the rectum.

It is generally easier, when one has ascertained the situation of an object by using the speculum, to lay it aside during one's manœuvres of extraction. All the same, one may find it just as well, in certain cases, to depress the fourchette with a very short, flat valve.

The forceps should be made to glide along a finger introduced so as to reach the foreign body; if there are any fibrous bands holding it back they should be divided with a pair of scissors, trusting rather to being guided by one's fingers than one's eyes. As for hair-pins, which constitute an important class of foreign bodies, one ought to remember that their points are nearly always directed forwards, and may have got embedded in the vaginal wall, which necessitates their being extricated. If one has to deal with bulky objects having rough surfaces, one ought only to exercise any traction upon them after seizing them with a large pair of forceps, or after protecting the vaginal walls with retractors or small slips of pasteboard. Last of all, for very voluminous objects, one may, if they are strong, break them up with some of the instruments invented for removing vesical calculi; if they are merely very hard, one may make use of

the instrument applied by Segond to the extraction of large polypi.

The cavity of the vagina should be carefully disinfected with injections and antiseptic tampons, special care being taken of the diverticulum in which was lodged the foreign body. Lastly, the treatment of the metritis should nearly always be subsequently followed up by the use of the curette.

BOOK XVI.

MALFORMATIONS OF THE GENITAL ORGANS.

CHAPTER I.

MALFORMATIONS OF THE VULVA.—HERMAPHRODISM.

General account of the development of the genital apparatus. Differentiation of the sex. Homology of the external genital organs in the two sexes.—Arrested development: complete atresia of the vulva and the urethra. Absence of septum. Ano-vulvar and ano-vaginal atresia. Hypospadias in woman. Epispadias. The ureter terminating in the vagina or the vulva. Permanence of the condition of childhood. Hypertrophy of the clitoris. Union of the labia minora. Malformations of the hymen; development; infantile hymen; anomalies of position; anomalies of number; anomalies of shape; atresia; anomalies of structure; congenital absence.—Hermaphrodisism. I. Partial pseudo-hermaphrodisism. A. Gynandria; B. Androgyny. II. Pseudo-hermaphrodisism proper. III. Feigned true hermaphrodisism.—Treatment of the malformations of the external genital organs.

THE genital organs in the two sexes have a similar embryonic origin: they are derived from the Wolffian body, Müller's ducts, and the genital glands.

The Wolffian body, or body of Oken, or primordial kidney, is a transitory body, which is found well developed about the 35th day, and which disappears at the end of the second month. It reaches from the upper part of the chest down to the pelvis, on either side of the vertebral column. It consists, first of all, of two longitudinal ducts; later on, one sees some tubes developed, which are first of all rectilinear, then flexuous, terminating in culs-de-sac, and with openings into each of the primary ducts. These latter, situated in front and outside this glandular mass seem to constitute the excretory ducts. Their lower extremity is situated in the posterior part of the uro-genital sinus, a large depression, occupying what will later on be the vulva, the perinæum, and the margin of the uterus. Near the inner part

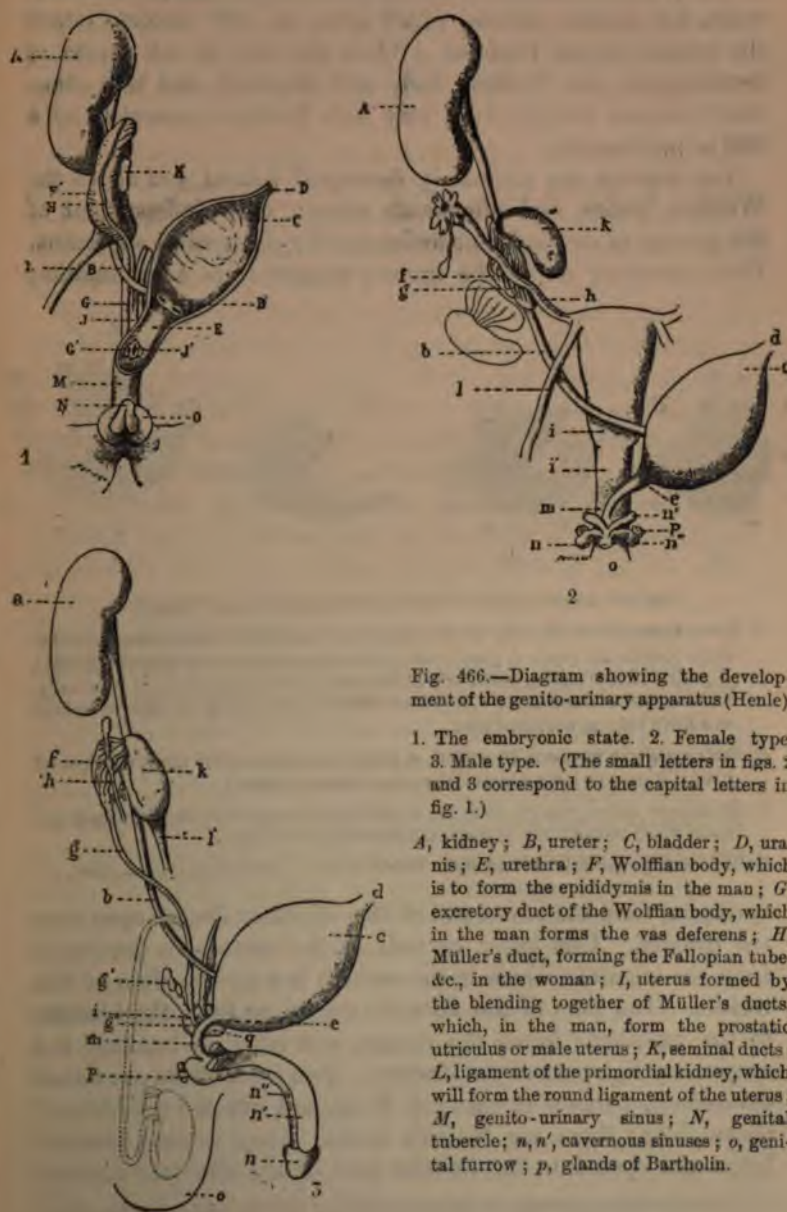


Fig. 466.—Diagram showing the development of the genito-urinary apparatus (Henle).

1. The embryonic state. 2. Female type. 3. Male type. (The small letters in figs. 2 and 3 correspond to the capital letters in fig. 1.)

A, kidney; B, ureter; C, bladder; D, uranis; E, urethra; F, Wolffian body, which is to form the epididymis in the man; G, excretory duct of the Wolffian body, which in the man forms the vas deferens; H, Müller's duct, forming the Fallopian tube, &c., in the woman; I, uterus formed by the blending together of Müller's ducts, which, in the man, form the prostatic utriculus or male uterus; K, seminal ducts; L, ligament of the primordial kidney, which will form the round ligament of the uterus; M, genito-urinary sinus; N, genital tubercle; n, n', cavernous sinuses; o, genital furrow; p, glands of Bartholin.

of the Wolffian bodies are found, towards the fifth or the sixth week, the genital glands, which later on will become either the ovaries or the testicles. While they are in the course of development, the Wolffian body will diminish, and will eventually become atrophied; it very soon becomes separated by a fold of peritoneum.

The kidneys are ultimately developed behind and above the Wolffian bodies, and afterwards remain quite independent of the process of development undergone by the genital apparatus. Their excretory ducts, the ureters, formed from a granulation



Fig. 467.—Development of the external genital organs (Ecker).

- A. Lower extremity of the body of an embryo, at the eighth week; hermaphrodite stage (double the size); *e*, glands situated at the summit of the genital tubercle; *f*, genital furrow ending posteriorly at the opening of the rectum, and eventually forming part of the cloaca; *h*, *l*, genital folds; *s*, the body of the embryo ending as a fish's tail; *n*, umbilical cord.
- B. Female embryo at about 10 weeks; *a*, anus; *u*, *g*, uro-genital sinus, *n*, edges of genital furrow or labia minora (the other letters as above).
- C. An embryo rather younger than the preceding one, magnified twice, to show the stage which immediately precedes the indication of the sex.
- D. Male embryo towards the end of the fourth month. (Same lettering as above.)

springing from the lower end of the Wolffian duct,* open into the bladder. This latter, as well as the urethra, is developed from the allantois, which in the embryo is a diverticulum of the rectum. The part of the allantois extending from the bladder to the umbilicus forms the uracus, and later on becomes the suspensory ligament of the bladder. Two other ducts are found developing, parallel to those of Wolff, and situated outside and above them: these are Müller's ducts. They become blended below and open into the inferior part of the allantois, beneath

* This dependence accounts for the ureters opening into the vasa deferentia, which are represented, in man, by persistent and developed Wolffian canals.

the vesical dilatation, at a point which will eventually form the urethral canal. The cavity in which the canals of Müller open has a large communication behind with the rectum, and on account of this it goes by the name of the cloaca (figs. 468 and 469).

Up to the third month the embryo has no sex, or, to be more accurate, it possesses the elements of both sexes; it belongs to an indifferent or indeterminate sex. But at this time the evolution of the internal organs becomes directed towards either the male or the female type.

Should the former be the one about to be developed, Müller's ducts become obliterated and disappear, leaving but a vestige at their lower extremity, which is fixed, and opening into the genito-urinary sinus (now become the prostatic-membranous portion of the urethra); they open at this point by a common orifice, terminating in a cul-de-sac, the prostatic utriculus or male uterus. At the same time the middle portion of the Wolffian body forms the cones at the head of the epididymis, whereas the tail of that organ, the vas deferens and the ejaculatory canals are derived from the Wolffian duct. The genital gland becomes transformed into the testicle (fig. 466, 1 and 3).

If the individual is about to belong to the female sex, the genital gland becomes an ovary, and it is Müller's canal which will persist, whilst the Wolffian body and its duct will atrophy and disappear almost entirely, leaving as a vestige nothing but Rosenmüller's body, in the thickness of the broad ligament.

As for Müller's ducts, they will form the Fallopian tube out of their upper part, and their middle and lower portions will become blended together in order to form the uterus and vagina. This union begins at this lower extremity, and the very short duct which results, opens, as I have said, in the cloaca. At the end of the second month the two Müller's ducts come in contact with one another, but are still separated throughout their whole extent except at their mouths by a median partition, resulting from their juxtaposition; this partition persists at the upper part until about the fourth month.

The round ligament formed out of the ligament of the Wolffian body becomes inserted at the junction of the lower two-thirds of Müller's ducts. This landmark is important to help one in estimating the arrest of development (fig. 466, 2).

The external genital organs are developed out of the genital tubercle or prominence. This appears, according to Kolliker, during the sixth week of foetal life, and is fairly well developed two weeks later. On either side two folds become formed—the genital folds. At the end of the second month the tubercle or prominence becomes greater, and one can then recognise on its posterior surface a furrow running in the direction of the orifice of the cloaca, the genital furrow giving it a bifid appearance. Very shortly the perinæum advances like a median spur with two lateral elongations,* which become joined together (median raphe) at the point where the allantois opens into the rectum, and transforms the recto-allantoidean cloaca into two parts—the uro-genital sinus, situated in front, and the anus, situated behind. In the first, one finds the terminations of the inferior segment of the allantois, which becomes narrowed so as to form the urethral canal, and the two ducts of Müller which

* Rathke. *Abhandl. zur Entw.*, 1882, vol. 1, p. 57.—The formation of the perinæum exclusively out of the perinæal spur or fold was first of all described from an account of the development of the rabbit.

The existence of the raphe of the perineum which extends in man as far as the scrotum and the root of the penis, helps towards proving Rathke's theory.—Kolliker (*Embryology*, Fr. transl., 1882, p. 1040) and Mikalowiks (*Journ. inter. mens. d'anat. et d'histol.*, vol. 2, p. 310) admit the mixed formation at the expense of the spur and the lateral folds.

Tourneux (*Journ. de l'anat. et de la physiol.*, Sept.—Oct. 1888, p. 503, and *Bull. de la Soc. de Biologie*, 8th Feb., 1890, p. 75) holds exclusively to the theory of the spur or vertical perinæal fold interposed between the rectum and the allantoidean canal. His researches dealt only with the embryo of the sheep. He distinguishes two phases in the descent of the perinæal fold. 1st. Lowering of the spur in the interior of the cavity of the cloaca; 2nd. The sliding of the fold containing the cloaca along the cloacal plug. (Tourneux designates under this name the solid epithelial mass which forms in front a limit to the cavity of the cloaca, uniting the ectoderm to the endoderm, and which the investigations of H. Strahl justify one in joining to the knot of the primary line.) The cavity of the cloaca becomes definitively obliterated by the cloacal plug adhering to the anterior surface of the perinæal spur.

Ed. Retterer (*Bul. de la Soc. de Biolog.*, 4th Jan., 1890, p. 3, and *Journ. de l'anat. et de la physiol.*, 1890, pp. 126, 153) obtained different results, when studying the embryos of the pig and the rabbit and making use of collodium, according to Mathias Duval's method, so as to maintain the organs in their natural relations. The cloacal fold would be sure to descend, as has been announced by all observers, but this descent would be the result of the two lateral prominences of the cloaca becoming blended in the median line. This single fold owes its existence to nothing but the union of the two lateral folds, and will give rise to the division or urethro-rectal septum; it is a process which reminds one of the closure of the medullary canal by the medullary folds being brought in contact and blending together. Thus the formation of a partition in the cloaca and the establishment of the perinæum would be just what Rathke indicated; but instead of the five folds admitted by that author, the whole process is reduced to the existence of two lateral folds.

become fused together in order to form the vagina (figs. 470, 471, and 472).

During the third month this transformation of the cloaca is effected, and at the end of the same month the differentiation of the sex already becomes marked (fig. 467); in the male embryo the genital tubercle becomes the penis, and the genital furrow becomes closed to constitute the penine portion of the urethra, whilst the genital folds, situated behind, become blended in



Fig. 468.—*R*, rectum continuous with *All*, allantois (bladder) and *M*, Müller's canal (vagina). *x*, depression in the skin, above the median tubercle; this increases in an inward direction, and forms the vulva.



Fig. 469.—The depression advances in an inward direction, and, becoming continuous with the rectum and allantois, form the cloaca *cl*.



Fig. 470.—The cloaca becomes divided into the uro-genital sinus *Su*, and *a* anus, by the descent of the perineal partition. Müller's ducts become blended together to form the vagina *V*, behind the bladder *B*, and the orifice of the urethra *u*.



Fig. 471.—The perineum is completely established.



Fig. 472.—The upper portion of the uro-genital sinus becoming narrowed to form the urethra, the inferior portion persists, and forms the vestibule *Su*, into which the urethra and the vagina have their openings.

Development of the external genital organs. Diagram (Schröder).

order to form the scrotum; in the female embryo these folds form the labia majora, and the edges of the genital furrow constitute the labia minora; the genital tubercle itself becomes the clitoris. The genital furrow does not close either in front or behind, the result is that the woman is entirely wanting in the portion of the urethra connected with the clitoris, and the canal has its opening in the adult, in a region similar to that in the eight months' foetus, an arrangement which is seen in the

man when there is arrested development (hypospadias). The corpus spongiosum of the urethra, produced by the edges of the genital furrow turning into erectile tissue, also becomes completely developed in the man, and entirely surrounds the urethral canal in its superadded or penile portion. It remains abortive in the woman throughout the whole extent of its intermediary or vestibular portion, and it is reduced to its two extremities, the inferior, or bulbs of the vagina, homologous to the bulb of the urethra, owing to their being rendered double by the persistence of the genital cleft, the superior, or glans clitoridis, which forms a head to the corpora cavernosa of the clitoris, homologous to the corpora cavernosa of the penis in the male.*

By the internal part of the bulb of the urethra, one finds still subsisting the membraniform vestiges of a part of the organ which has become fully developed in man as the bulb of the urethra; this is what constitutes the hymen. Above, joining the bulb and hymen to the clitoris, and representing the vertical or cylindrical portion of the corpus spongiosum in man, there exist in woman a band and a vascular fasciculus, the frenum of the vestibule in the male, first described by myself, and the intermediary network of Kobelt.

If one wishes without much trouble to get a good conception of the homology of the various parts of the external genital organs in the two sexes, one ought to imagine the penis to be split up from the urinary meatus to the level of the bulb. The section of the urethral canal in man, just where it enters into the bulb, is an exact representation of the urinary meatus in woman, encircled by the bifurcation of the male frenum, a vestige of the corpus spongiosum of the male urethra. To establish the symmetry, one has to raise the penis thus split open, and place it against the pubis, putting the glans penis into the same situation under the pubis as the glans clitoridis.

* The corpora cavernosa are intimately connected in their development with the bones of the pelvis, and are first of all absolutely double. The prepuce appears about the sixth month. According to Bokai, for a certain time after birth the glans and the prepuce remain adherent in male children. This fact should be mentioned in connection with the congenital agglutination of the labia minora in woman. The prostate appears at the third month, and is already visible at the fourth. It is first of all merely represented by a thickening of that point where the urethra and the genital cord meet, at the commencement of the uro-genital sinus; the glands become developed during the fourth month.

It is then easy enough to recognise the homology between the following points, which I have tried to establish since 1884.*

WOMAN.	MAN.
Glans clitoridis	Glans penis.
Hood of the clitoris	Upper portion of the prepuce.
Corpus cavernosum of the clitoris	Corpus cavernosum of the penis.
Frenum of the vestibule and intermediary network of Kobelt	Cylindrical portion of the corpus spongiosum of the urethra.
Hymen and bulb of the vagina ...	Verumontanum and bulb of the urethra.
Frenum of the clitoris	Frenum of the prepuce.
Labia minora	Deep layer of the scrotum.
Labia majora	Superficial layer of the scrotum and sheath of the penis.
Vestibule and very small portion of the vagina behind the hymen (1 to 2 millimetres)	Membranous and prostatic portion of the canal of the urethra, reaching to the level of the prostatic utriculus (or male uterus), which is homologous to Müller's vagina.
Bartholini's glands.....	Cowper's glands.

The uro-genital sinus is first of all relatively long, and it is in direct continuity with the inferior part of the allantois, that is, with the canal of the urethra. Later on, there is nothing left of it but a very short space which one might call the vulvar canal, prolonging the vestibule immediately behind the hymen (figs. 471 and 472). This space, almost completely obliterated in adult women, is still well marked in small girls, and to this fact is due the deep situation of the hymen in children, mentioned by Budin. The uneven development of these various parts will completely mask, shortly after birth, the connections they originally had in the embryo: thus the vulvar or vestibular canal, the last vestige of the anterior part of the uro-genital sinus, will appear directly continuous and blended with the vagina of Müller, whereas in the embryo it was independent of

* S. Pozzi. *Annal. de Gyn.*, April, 1884, t. 31, p. 257;—Report of the Internat. Congress of med. sciences, Copenhagen, 1884, t. 1, p. 67.—See on the same subject: A. Guinard. *Comparison of the external genital organs in the two sexes. Theses for the licence.* Paris, 1886.—Picqué. *Encycl. internat. de chir.* French edit., t. 7, p. 726.—Issaurat. *The genito-urinar sinus. Thesis for M.D.*, Paris, 1888.

it, and constituted the prolongation of the inferior part of the allantoid or urethral canal (fig. 471). In other words, it was first of all the vagina of Müller which seemed to open into the entrance of the urethra on a level with the vestibular dilatation, whereas later on the urethra seemed to open into the entrance of the vagina, which is mistaken for the vestibule (fig. 472). The distinction which I have just been pointing out between the

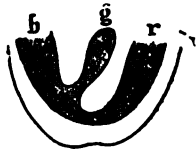


Fig. 473.—Complete atresia of the vulva. *r*, rectum; *g*, genital canal; *b*, the bladder communicating with them.



Fig. 474.—Complete atresia of the vulva. The allantois has become separated from the rectum *r*; the bladder *b*, and the genital canal *g*, are distended by the urine.

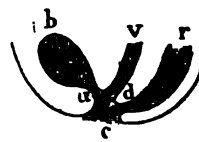


Fig. 475.—Vaginal atresia of the anus. The perineum *d*, is not yet formed and the cloaca persists; the bladder *b*, the vagina *v*, and the rectum *r*, terminate in this common cloaca; *u* urethra.

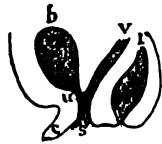


Fig. 476.—Hypospadias in the woman. First degree coinciding with hypertrophy of the clitoris. *S*, persistent urogenital sinus, to which succeeds a long vestibular canal; *u*, urethra, and *v*, vagina, opening into the vestibular canal; *c*, hypertrophied clitoris.



Fig. 477.—Properly so-called hypospadias in woman. The allantois is entirely transformed into the bladder *b*; this latter opens directly, without the help of an urethra, into the urogenital sinus *s*, that is, into the vestibule; *v*, vagina; *r*, rectum.

Malformation of the external genital organs. Diagrams (Schröder).

vagina of Müller and its vestibular antechamber is very important in helping one to understand any malformations.

Arrested development.—The following are the various forms in which it may occur at this initial period:—

Complete atresia of the vulva and urethra may result from the fissure not occurring in the genital tubercle, and from the absence of the genital furrow which prolongs the uro-genital sinus in a forward direction. There is then no vulvar opening. According to whether the division in the cloaca has taken place

or not, the rectum, bladder, and genital canal are separated or communicate (figs. 473 and 474). Children suffering from this latter malformation are not generally viable. The urethra being absent or imperforate, the bladder and genital canal are considerably distended by the urine.

The absence of any partition in the cloaca is sometimes found all by itself, the uro-genital sinus being open and communicating freely with the rectum, which does not terminate in the anus, but seems to open into the vagina; this is what has been called ano-vulvar or vestibular and ano-vaginal atresia (atresia ani vestibularis or ani vaginalis)* (fig. 475). As a matter of fact the rectum does not in this case open into the vagina, but into the uro-genital sinus, an appendage of the allantoid, serving as a confluent to the rectum, to the vagina, which is sometimes divided by a septum, and to the urethra. What makes it difficult to establish the homology is that efforts have been made to render the connections subordinate to the altogether accessory consideration of the respective dimensions of the parts. There may be also a simple congenital ano-vaginal fistula.†

Hypospadias in the woman corresponds to an analogous, but less marked, arrest of development. The perinæum will have undergone normal development, whereas the uro-genital sinus will have preserved the arrangement it had in the embryo. In certain cases, which constitute the first degree of the lesion, the vulvar or vestibular canal is long and narrow (like the urethral canal) and receives the opening of the urethra and the vagina

* Heppner. *Petersb. med. Zeitschr.*, 1870, Bd. 1, p. 204.—Rovillain. *Contrib. to the study of malformations of the anus, and of the vulvar anus in particular*. Amiens, 1872.—Rizzoli. *Dell'ano vulvare* (*Mem. dell' Acad. delle scienze del' Inst. di Bologna*, 1875, t. 5).—J. v. Massari. *Wien. med. Woch.*, 1879, No. 33, p. 870.—R. Winternitz. *Prag. med. Woch.*, 1883, Bd. 8, p. 149.—Aveling. *Lancet*, 1884, t. 2, p. 1085.—W. Jacobowitsch. *Arch. f. Kinderkr.*, 1886, Bd. 7, p. 401.—Hadra. *Soc. méd. de Berlin*, Nov., 1888 (*Berlin klin. Woch.*, 1888, p. 1018).—P. Peuch. On congenital openings of the rectum into the vulva and vagina. Thesis for M.D., Montpellier, 1890.

† The cases are very rare where one finds combined with a normal condition of the anus and rectum a congenital communication between that canal and the vagina or the vulva. Caradec. *Gaz. des Hôp.*, 1863, No. 7, p. 27. In this case the fistula is described as opening below the vulva, but there is probably here an error of interpretation, and one has to deal, in reality, with a second, rudimentary vagina, communicating with the rectum.—See for the explanation of these cases of ano-vulvar fistula, with no anal narrowing: Paul Reichel. *Die Entwicklung des Dammes und ihre Bedeutung zur Entstehung gewisser Missbildungen*. (*Zeitschr. f. Geb. u. Gyn.*, 1887, Bd. 14, Heft 1, p. 82; he reports one case.—A. v. Rosthorn. *Unvollkommene Cloakenbildung, &c.* (*Wien klin. Woch.*, 1890, No. 10, p. 183) describes another case)

fairly high up. It has been a mistake to consider this arrangement as a simple opening of the urethral canal, at a high level, into a vagina which is narrowed in its lower part. The hypertrophy of the clitoris frequently coincides with this malformation, which is the lowest degree of hypospadias in the woman (fig. 476).

Hypospadias, properly so-called, takes place when, after the regular disappearance of the uro-genital canal, the inferior part of the allantoid, which should have been transformed into the canal of the urethra, has been abnormally included in the formation of the bladder. The urethra is then totally absent, and the vagina and bladder open together into the vestibular canal,* which produces the appearance clinically of the neck of the bladder having an opening in the vagina.

Epispadias † is a malformation which is somewhat rare in women, and its exact origin has not yet been decided. It may co-exist with extroversion of the bladder, and want of union of the symphysis pubis, as well as with atresia of the anus. It certainly bears some relation to a defective disposition of the allantoid, acting as an obstacle to the development of the urethral canal, and to the anterior portion of the vulva.‡ A bifid condition of the clitoris has been found to constitute the entire lesion.§

I shall not speak of those cases of extroversion of the bladder

* Mosengeil. Arch. f. klin. Chir., 1870, Bd. 12, Heft 2, p. 721.—Lebedeff. Ueber Hypospadië beim Weibe (Arch. f. Gyn., 1880, Bd. 16, p. 290).

† Gosselin. Gaz. des Hôp., March 1851, No. 37, p. 145.—Testelin. Gaz. méd. de Paris, 1861, No. 46, p. 733.—Kleinwächter. Monatschr. f. Geb., 1869, Bd. 34, p. 81.—A. Herrgott. On vesical extraversion in the female sex. Paris, 1874.—Mörcke. Zeitschr. f. Geb. u. Gyn., 1880, Bd. 5, p. 324.—Núñez. Study of malformation of the urethra in women. Thesis for M.D., Paris, 1882.—R. Frommel. Zeitschr. f. Geb. u. Gyn., 1882, Bd. 7, p. 430.—Dohrn. Ibid., 1886, Bd. 12, Heft 1, p. 117.—Guinard. *Loc. cit.*—Emmet. The study of diseases in women, French trans., Paris, 1887.—Richelot. Union Méd., March, 1887, 3rd series, t. 43, p. 365.

‡ E. Klebs.

§ J. Henle. Zeitschr. f. rat. Med., 1855, Bd. 6, p. 343.—Albrecht (ueber die morphologische Bedeutung von Penisschisis, Epi- und Hypospadië, in Verhandl. der deutschen Gesell. f. Chir., 15th session, Berlin, 1886, p. 124) has offered some remarks by way of interpreting these malformations which are full of originality, and of great value from an anatomical point of view. He points out how far, bearing atavism in mind, they are analogous to the normal arrangement in the invertebrate animals. One knows that the glans is double in didelphous animals, and that in the selacians there is a double hemi-penis. Albrecht also proves that the two expressions, ventral and dorsal, which have until now been applied to the penis, ought to be given up.

which do not belong to my subject, and I shall confine myself to those in which the lesion is reduced to the urethral canal, which forms part of the external genital organs in the woman. In place of the vestibule and the meatus, one then finds a groove with its opening directed upwards, which will admit one finger, or a horseshoe opening with its upper curve applied to the symphysis pubis. The mucous membrane of the bladder forms a hernia, appearing as a small round swelling. The clitoris in one case (Nunez) seemed to be absent; it is generally bifid. The labia majora become divergent in their upper part, each of the labia minora is found attached to one-half of the bifid clitoris. There is frequently no separation to be found in the symphysis pubis. The incontinence of urine is never complete; the patients may suffer from it for a long time, but the slightest effort will cause the urine to flow, and it may be expelled as soon as there is any desire felt.

The opening of the urethra into the vagina or into the vulva,* near the meatus, constitutes a very rare malformation, but one offering great interest on account of the congenital incontinence of urine which it produces. Independently of the cases where the two ureters open into the vagina, owing to the absence of the urethra and of the neck of the bladder, as in true hypospadias, cases have been seen where the only malformation consisted in the ureter having an opening situated more or less near the urinary meatus. This is how one has tried to explain this anomaly: the ureter is formed by a granulation, shaped as an epithelial tube, springing from the Wolffian canal, near its cloacal portion. At a certain height this tube gives off two lateral granulating buds which become the uriniferous tubules, and terminate its upper extremity. Its inferior extremity, first of all, forms part of the cloacal extremity of the Wolffian body, and thus has a very short and transitory portion in common with this canal. Müller's duct, which descends along the Wolffian canal, opens into the cloaca, near this canal, in the neighbourhood of which it remains, although below the ureter. In the anomalous cases where there is a vaginal or vulvar

* Sécheyron. On cases of the urethra when opening abnormally into the vagina or at the vulva (*Arch. de tocol.*, April-May, 1889, p. 254, 335). It should be borne in mind that the ureter may also terminate in the rectum. See on this point, Jeannel. *Revue de chir.*, 1887, pp. 190 and 263.

opening of the ureter, the embryological perturbation takes place, no doubt, at this moment. If the ureter is late in becoming developed, if the granulation from which it has its origin appears on the Wolffian duct, not close to its inferior extremity, but higher up above the uro-genital sinus, the ureter loses its usual relations: it no longer has its opening sufficiently high up, it follows the Wolffian canal in the region of the vestibule where one knows that canal to descend,* and blends its origin with the vestiges of that embryonic organ.†

Total absence of the vulva is characterised by simple opening of the uro-genital sinus in the region of the vulva, without any of the parts entering into the formation of that region becoming developed. Is it possible for this anomaly to coincide with the normal development of the internal genital organs? Several cases have been found reported by ancient authors, but they are all open to doubt. Foville‡ has reported one case which seems as if it ought to be explained rather by the labia majora becoming glued together than by an arrest of development.

There is also absence of any relief of the vulvar region in the cases of which I have already spoken where a fœtus, generally still-born, presents total atresia of the vulva and the urethra; but the first part of the malformation is then very accessory.

Absence of the labia majora is the rule in cases of extroversion of the bladder; it may be observed independently of all abnormality, as I have seen an example. The labia minora may also be wanting,§ and this event is frequently combined with incomplete development of the clitoris. It is much more usual to find it hypertrophied. At times they form two or three thin folds placed in apposition, at others they greatly exceed in length the labia majora and protrude out of the vulva. This

* Debierre. On Gartner's ducts (Report to the Soc. de biologie, 22nd May, 1885, p. 318).

† The ureter may then remain imperforate (case of Sécheyron's); it is probable that in such a case the kidney becomes atrophied and cystic. Sécheyron's case is unfortunately incomplete in this respect.

‡ Foville. Bull. Soc. anat., Feb., 1866, p. 61.

§ D'Hotman de Villiers (Arch. de tocol., May, 1890, p. 272) has published a case of total absence of the labia minora; the clitoris is covered up by the labia majora, which are joined by fibrous adhesions which were obviously atrophied.—See also Auvar. Trav. d'Obstét., 1889, t. 2, p. 533.

disposition, greatly exaggerated in certain races, gives rise to what has been called the Hottentot apron.* Absence of the clitoris has been found combined with epispadias.

The vulva has been found to continue in the infantile condition generally in debilitated subjects, who are suffering at the same time from incomplete development of the uterus and the tubes. It is known that, according to Freund, this incomplete development of the oviducts predisposes them to attacks of inflammation; any signs, therefore, which one can get from examining the vulva have a certain clinical value.

Hypertrophy of the clitoris, rare in our part of the world, seems to be of more frequent occurrence in the tropics. It may give rise to some doubt as to the nature of the sex, when it coincides with apparent occlusion



Fig. 478.—Infundibuliform hymen and male bridle in a newly-born foetus.

b, Bridle; *mu*, urinary meatus; *h*, hymen; *ov*, vulvar orifice.



Fig. 479.—Remains of the hymen and male bridle of the vestibule in a woman after a confinement.

b, bridle; *mu*, urinary meatus; *h*, remains of the hymen; *ov*, vulvar orifice.

of the external genitals. Hypertrophy of the clitoris has been observed, as an accessory malformation, in other anomalous cases, such as those of hypospadias and bifid condition of the genital tract (fig. 482). Union of the labia minora does not seem always to constitute a congenital malformation, but may result from the parts being glued together in a manner analogous to that in which the prepuce is united to the glans in cases of

* R. Blanchard. The study of steatopagia and of the Boschiman women's apron (Bull. de la Soc. zool. de France, 1883, p. 15 et seq.).

phimosis in small boys. Thus one may find in small girls the nymphæ glued together up to the level of the urethra so as to occasionally interfere with micturition. These adhesions give way easily enough when simply pulled upon.* The labia majora may also be glued together, to a certain extent, in front of the fourchette.

Development of the hymen. Malformations.—The hymen is late in becoming developed in the female embryo; it is only during the nineteenth week that one sees the circumference of the vulvo-vaginal tube forming a sort of fold at the anterior orifice of the vaginal canal, which is formed above by the fusion of Müller's ducts and below by the vestibular canal, a vestige of the uro-genital sinus. One finds, in the first instance, two lineal prominences which advance towards the middle line until they meet; the hymen is, at that moment, a double organ, and the small band which it forms on either side of the uro-genital slit is continued beyond the opening of the urethra, almost up to the base of the clitoris. When the vulvar and urethral orifices are fully developed they are both surrounded by this band, which forms the hymen round the former and an annular pad round the latter, to be distinctly seen in infants, and continuous below with the hymen, and above with the median prominence, analogous to the bridle in cases of hypospadias in the male. Thus there are three parts, which together form the hymen apparatus: (1) the hymen; (2) the pad of the meatus (sometimes sufficiently well-marked to deserve the name of urethral hymen); (3) the male bridle of the vestibule. The anomalies of development may take place in any of these three segments, and the connection between them, unrecognised up till now,† will help to interpret many facts which, without, would be difficult to explain.

* Bokai. Ueber zellige Atresie der Schamspalte bei Kindern (Jahrb. f. Kinderkr., 1872, Bd. 5, pp. 26 and 163).

† S. Pozzi. On the male bridle in the vestibule and the origin of the hymen. (Bull. et Mém. de la Soc. de biologie, 26th Jan. and 16th Feb., 1884);—Gaz. méd. de Paris, 23rd Feb., 1884, p. 85;—Annal. de Gyn., April, 1884, t. 21, p. 268;—On an unrecognised peculiarity of the female external genital organs (Report of the intern. Congress of med. sciences, Copenhagen, 1884, t. 1, p. 67).—I ought to insist upon the dates of my works, since, by a curious omission, they have not been cited in the analysis of a work produced several months after my first publications: O. Küstner (of Iena). Das analogon des Corpus cavernosum Urethroe beim Weibe, read the 23rd May before the Soc. of med. and nat. hist. of Iena. (Centr. f. Gyn., 1885, p. 25.)

This theory of the origin of the hymen is, in reality, contrary to the one usually accepted.* It is generally admitted, after what has been said by Blandin in France, and Henle in Germany, that the hymen is a simple protuberance of the vagina. Budin even compares the way in which the anterior extremity of the vagina penetrates into the vulvar canal to the way in which the neck of the womb protrudes into the vagina.†

The hymen in the infant.—In the child, at birth, the whole apparatus of the hymen is largely developed, and its three parts are quite distinct. The hymen, even then, is of such a size that it has been mistaken by inexperienced observers for the labia minora, whilst these latter were looked upon as the labia majora, leading to the conclusion that the hymen was absent or destroyed; one can see the importance of such an error in legal medicine.‡ It is often arranged as a small collar which is very prominent, especially at its inferior part, and arranged as “a gargyle,” or as a bursa folded like “a tobacco pouch.”

But the labiated form is the commonest (Brouardel). An antero-posterior slit separates two valves running forwards from the bulb of the vagina as far as the posterior part. In the newly born infant it will allow of the introduction of a bougie 0.009 of a metre in diameter. This form may persist during

* Ledru. On the membrane named the hymen. Thesis for M.D., Paris, 1855.—F. Roze. On the Hymen. Thesis for M.D., Strasburg, 1865.—J. Henle. Handb. der Eingeweidelehre, 1886, p. 444. Budin. Study of the hymen and vaginal orifice (Progès. méd., 1879, pp. 677, 697, 717, and 737, and Bull. de la Soc. de Biologie, 1880, p. 265).

† A proof of the independence of the vagina and hymen, which seems peremptory to me, is the existence of this membrane, which has been ascertained several times, in cases of total absence of the vagina. How, in fact, could the part exist, if the whole had been suppressed? It is as unfair as it is convenient to challenge, as does Dohrn (Die Bildungsfehler des Hymens in Zeitschr. f. Geb. u. Gyn., 1884, Bd. 11, p. 1) Hofmann's observation (Handb. der gericht. Med., p. 115) relating to a hymen with three orifices found in a case of total absence of the vagina, as well as my own case, where in similar circumstances the circular hymen was perfectly developed (Bull. de la Soc. de Biologie, 16th Feb., 1884). But since then numerous facts have been published. See Grohe's institut (Greifswald), mentioned by Winckel. Lehrb. der Frauenkr., 1886, p. 80.—Bruna. Centr. f. Gyn., 1888, p. 366. Zweifel. Soc. obst. et gyn. de Leipsick, 21st Jan., 1889 (ibid., 1889, No. 25, p. 411).—Las Casas de Santos. Zeitschr. f. Geb. u. Gyn., 1888, Bd. 14, Heft 1, p. 151. The latter author has seen in Schröder's wards three cases of total absence of the vagina with a well-developed hymen. One can no longer overlook these frequent cases, as did Dohrn in the first two instances. Lastly, as I shall point out further on, the hymen has sometimes been met with in a man with hypospadias, and its connections with the frenum beneath the penis, the result of aplasia of the corpus spongiosum, make its true affinity quite evident.

‡ A. Doran. Handbook of gynæc. operations, 1887, p. 4.

the whole life. In a child of seven years a bougie of 0·01 metre can be introduced, and in a young girl at puberty the finger penetrates easily.

There may be a prominence of the posterior part of the left lip of the hymen, in front of the right lip of the hymen. The parts here cross one another in a manner analogous to that of the pillars of the diaphragm, and owing to the position of the different planes, one observes a furrow entering the orifice of the hymen obliquely, and running from behind forwards, and from right to left.

Brouardel* has published some remarks on the hymen in young girls having great bearing upon legal medicine. On examining when the legs are separated, the membrane becomes so tense that the finger cannot penetrate; but if the thighs are brought together, the hymen becomes folded into a pouch, and the posterior valve becomes lowered, leaving an orifice with much greater dimensions, and one which can be more easily distended. There is no longer any difficulty in the way of penetration, and it is as well to note that the penis of the accused may have met with none greater than that which has been overcome by the finger of the expert.

It often happens that the arms of the crescent represented by the membrane, and inserted more or less near the anterior column of the vagina, undergo an arrest in development. The free edge then presents some notches (two or three notches are frequent); they occur nearly symmetrically, generally on the arms of the crescent, at the junction of the upper and the two lower thirds. These notches have sometimes a depth of two or three millimetres. In some cases there is but one notch on one of the branches, the other being intact. In other rarer cases, one finds four, two being placed symmetrically behind at the junction of the lower and middle third, the two others as above; so that the membrane of the hymen is practically formed by a median posterior prominence, two lateral prominences of moderate size, and two small anterior prominences. The seat of these notches, and the intact condition of their edges, found to be free when they are unfolded, will enable one to make a dis-

* Brouardel. Causes of error and rules for experts in cases of rape (*Gaz. des Hôp.*, 1887, p. 686);—The membrane of the hymen; its examination; its different forms (*ibid.*, p. 901).

inction between a case of natural arrested development, and one of accidental tearing.

Tearing of the hymen due to coitus is not constant; this may take place without causing any rupture, especially if the young girl consents. Budin has found an intact hymen 13 times in 75 primiparæ.

Brouardel and Laugier have shown by a case which was as good as a proof, that tears in the hymen can become cicatrised a few days after rape has taken place. But by a careful examination one will always be able to see the white and fibrous cicatrix.

On the other hand, certain normal furrows are frequently mistaken by medical men without experience for former ruptures. To avoid any error it is quite sufficient to introduce the finger, and use the tip to feel for traces of a cicatrix.

In small girls there may be various other morphological peculiarities of congenital origin which the medical legist requires to be carefully warned about, so as to avoid very serious errors. Small white spots like hemp seeds, due to hypertrophy of the sebaceous glands, and appearing slightly raised upon the surface of the labia minora, are in noways signs of attempted intercourse, as has been maintained. A special disposition of the vulva in some children might give rise to great uncertainty. Dolbeau has described a special injury in small girls following attempts at coitus when the genital tract is too narrow. He has given the name of vulvar canal to the infundibulum or false tract which is burrowed by the penis, just above the fourchette. A very similar appearance is presented when the vestibular canal of the foetal period has remained abnormally developed, and this peculiarity sometimes runs in families. Brouardel mentions that he has observed in a small girl a vulvar canal into which he could introduce his thumb. The mother had accused the father of having made an attempt upon his child while she was absent with her other daughter. Brouardel examined the latter and found that she was affected with the same conformation, which was evidently a family peculiarity.

Abnormalities of situation.—In the child at birth, the hymen is situated much more deeply, the vestibule being much more sunken (Budin); this arrangement is much more marked in the

negro race.* In the adult the hymen may be found placed abnormally high up. Krimer† has found it at a depth of two centimetres, in a young girl of twenty years, in whom at first sight the vulvar orifice appeared to have none at all.

Abnormalities of number.—Cases have been found of supposed double hymen. Some are merely membraniform occlusions of the vagina, in newly-born infants, due to adhesions of the walls of this passage with an accumulation of mucous above;‡ others, sometimes seen in adults,§ are probably nothing but vestiges of an analogous lesion, come on during fœtal life or infancy. One might at other times find an abnormality due to reversion, reproducing what is a normal arrangement in many animals, as I shall point out farther on. In one case, Friso (of Metz) found five hymeniform membranes in a pregnant woman, who, at the time of puberty, had undergone incision of the hymen for retention of the menstrual fluid.

Abnormalities of form.—If one accepts the theory which I have formulated with regard to the origin of the hymen, one will not be surprised at the great varieties of form and proportion which it presents. In fact, one has not to deal here with what one might call a fixed organ, but with a vestige or embryonic residue of the organ of the corpus spongiosum¶

* Turnipseed. Amer. Journ. of Obstet., 1877, t. 10. According to Bischoff (Abhandl. der k. Bayer-Akad., 1879) and Canstatt's Jahresh., 1879, t. 1, p. 4, the hymen is absent in anthropomorphous apes; in them the vestibule is exceedingly deep.

† Krimer. Missbildung der weiblichen Geschlechtsteile. (Hufeland's Journ., Sept., 1834, p. 48.)

‡ Breisky. Die Krankh. der Vagina (Deutsche Chirurg., Lief. 60, 1886).

§ Säger (Arch. f. Gyn., Bd. 36, Heft 3) has observed obliteration of the vagina in its lower third, by a membrane situated 4 centimetres above the hymen, in which with great difficulty a small orifice was to be found; the woman was 7 months pregnant. Incision of this membrane was performed, and the pregnancy continued. (Centr. f. Gyn., 1889, p. 440, and in C. Heyder, Arch. f. Gyn., 1889, Bd. 36, p. 502.)

¶ Friso. Gaz. des Hôp., 1861, No. 96, p. 382.

¶ The corpus spongiosum of the urethra is formed by the deep layer of the urethral mucous membrane turning into erectile tissue. If one refers to what I have said about the homology of the genital organs in man and woman, and about the way to make it apparent by slitting up and raising the penis, one will see that the mucous membrane of the penile portion of the male urethra ought to extend in the woman from the urinary meatus to the clitoris. It is precisely the seat of the frenum of the vestibule which one ought to consider as exactly homologous to the upper part of the penile portion of the urethra in man; it has, besides, the same fibro-elastic structure. I have used the expression, organ of the corpus spongiosum, so as to be able to apply a common name to the organs out of which becomes developed the erectile tissue of the corpus spongiosum in man and of the bulb in woman, organs

which, found completely developed in man, becomes aborted in woman, in whom it remains in the form of a membrane, with the exception of its more external part, which is turned into erectile tissue so as to form the bulb of the vagina. This extreme variability is explained quite naturally, like that of Rosenmüller's body in woman, or the organ of Giralaldès in man.

All the same, a more frequent form of this membrane is found

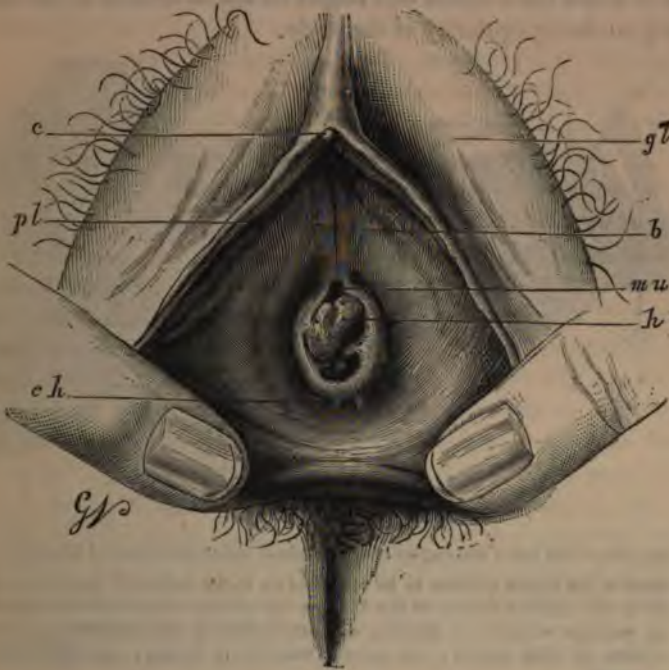


Fig. 480.—Abnormality of the hymen. Fleshy and thick (godronné) hymen in a young virgin.

c, clitoris; *gl*, labia majora; *pl*, labia minora; *b*, male frenum of the vestibule; *mu*, urinary meatus; *h*, hymen.

in the adult: this is the annular form. The hymen is called circular when the orifice is quite central; semilunar when it is nearer the upper edge, which gives the membrane the shape of a

which are similar in the two sexes. It would be interesting to find out, in the female embryo, the process by which the bulbs of the vagina turn into erectile tissue and their original connections with the hymen.

crescent; falciform, when there is a very large orifice leaving but a very small fold at the lower part.*

These varieties have been described under the most different names:—

The fleshy and thick hymen (*godronné*, *denticulatus*) (fig. 480) is due to a persistence of the infantile type; in a medico-legal examination it is necessary to unfold it, to make certain that it is not torn, which one might be led to believe is the case owing to the irregularity of the folds.

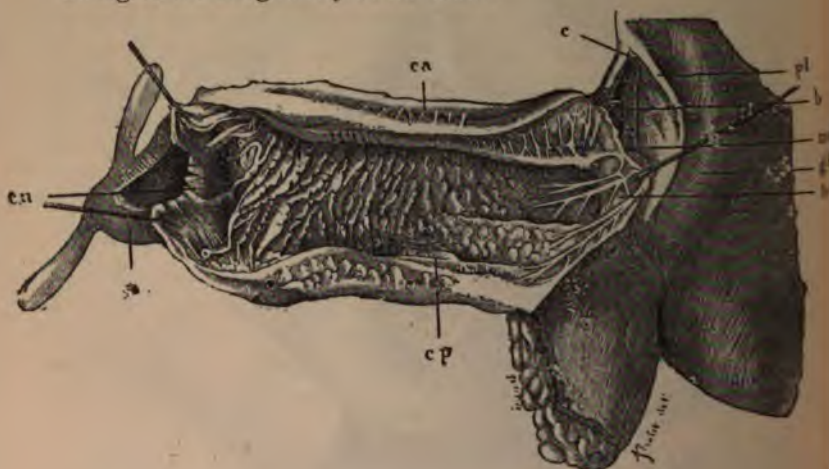


Fig. 481.—The vulva and vagina of an 8 months' foetus (side view of interior).

The folds of the vagina are seen to be continued on to the surface of the cervix, and on to the internal surface of the hymen; *ca*, anterior column of the vagina; *cp*, posterior column; *c*, clitoris; *d*, male frenum of the vestibule; *pl*, labia minora; *gl*, labia majora; *mu*, urinary meatus; *h*, hymen; *cu*, cervix uteri; *u*, uterus.

The carinated and linguliform hymen is but a variety of the preceding form.

The fringed hymen is much rarer.† The infundibuliform hymen, directed forwards like the calix of a flower, reproduces the infantile type; in its most marked degree it deserves the name of hypertrophic hymen, and this arrangement is often

* J. Heitzmann. *Abnorme Bildungen des Hymens* (Wien. med. Presse, 1884, t. 25, p. 242).—Dohrn. *Die Bildungsfehler des Hymens* (Zeitschr. f. Geb. u. Gyn., 1884, Bd. 11, Heft 1, p. 1).—Courty (*loc. cit.*, p. 112) has reproduced several figures from the theses of Roze and Ledru.

† Luschka. *Der Hymen fimbriatus* (Zeitschr. f. rat. Med., 1866, Bd. 26, p. 300).

associated with some much more serious malformation of the genital organs. The hymen with a septum (*cloisonné*, *septus*, or *biseptus*) presents two orifices separated by a narrow band of fascia, which is generally widened at its posterior part. This disposition of the hymen, although very rare, is brought forward as a signal proof of its Müllerian origin by certain theorists. But it is in reality of no value whatever; besides, any value it had would be negated by the existence of cases of total imperforation.*

Frequently the two orifices are not at all regular, and appear as two unequal windows (*hymen bifenestratus*); lastly, the whole membrane may be irregularly riddled with small holes; this is the *cribriform hymen*.

The hymen with columns (*hymen columnatus*) is the one found with a thickening, in the shape of a pilaster, on the posterior surface. This is a vestige of the columns of the vagina, most often of the posterior column; in the *foetus* it is found extending on the deeper surface of the membrane, just like the folds of the vaginal mucous membrane (fig. 481). In fact the hymen is formed out of a double slip, which can always be very clearly made out at the fifth month.† The external one is in connection with the vulva, and is the fundamental membrane of the hymen; the internal one is nothing but a covering derived from the interior of the vagina; the two slips become fused together later on, and the posterior surface becomes smooth, owing to the folds of the vagina being drawn back, whilst the epithelium of the vestibule covers the anterior surface, which continues to remain even.

Atresia of the hymen.—Whenever one finds the vagina closed by a thin membrane, one is tempted to look upon this latter as representing the hymen. But most often one has to deal with a vagina with an imperforate lower portion, or with some adhesion of the walls of this passage, and the hymen, pushed back by the menstrual fluid which has been collecting time after time,

* Other cases are still more convincing, and prove the independence of Müller's ducts and of the hymen, even in cases where there is a septum. Breisky has found traces of a vaginal septum quite separate from the hymen.—L. Corazza (*Schmidt's Jahrb.*, 1870, t. 4, p. 148), in another case of double vagina, has observed a single hymen placed at a distance of one millimetre in front of the septum.—Winckel (*Lehrb. der Frauenkr.*, 1886, p. 246) has reported a similar case.

† O. Schaeffer. *Bildungs-Anomalien weibl. Geschlechtsorgane* (*Arch. f. Gyn.*, 1890, Bd. 37, Heft 2, p. 199).

is merely glued to a membrane for which it seems to be mistaken, but from which it becomes separated after the evacuation of the hæmatocolpos. Matthews Duncan* has been often able in such a case to discover the circular hymen, which one supposed to be in a state of atresia, and he has presented a very good example of it. Schröder† expressly points out this error, and he has on two occasions observed on the inferior surface of the obturator membrane, mistaken for the hymen, the opening of this fold. There are, however, some undoubted cases where the hymen formed a continuous septum; in a case of Godefroy's‡ there was an accumulation of mucus in the vagina of a child two months old which was causing compression of the urethra and the rectum.

Some interesting facts have been published which prove the connection between the various portions of the hymen apparatus, and notably of the vulvar hymen and the frame or circular pad surrounding the urinary meatus. In the normal state one very frequently sees a prolongation shaped as an uvula or valvule, which becomes separated from the upper border of the hymen and partly covers up the orifice of the urethra. Cases have been described in which a very distinct hymen, provided with a fringe, was found surrounding the meatus,§ moreover, the hymen has been known to entirely cover up this orifice, giving rise to retention of urine in a newly-born infant.|| This is a superficial atresia, which one might call imperforation of the urethral hymen.¶ It ought not to be confounded with aplasia

* M. Duncan. Trans. Obst. Soc., London, 1883, t. 24, p. 212.

† Schröder. Dis. of the female gen. organs. French trans., 1886, p. 46.

‡ Godefroy. Gaz. des Hôp., 1856, p. 142.—It is a well-known fact, that in the fœtus, the vagina is filled with epithelial débris.

§ See the figure in a case of Luschka, in Gallard (Clinical lectures on dis. of women, 1879, p. 118), and one in a case of Ledru, in Courty (Practical treatise on diseases of the uterus, 1879, p. 112).

|| P. A. Böhmer. Observ. anat. rar., Halle, 1756, fasc. 2.—M. N. Tucker. Die regelwidr. Geb., 1826, p. 235.—C. H. Robin, art. Membrane, in Dict. of Nysten (editions published since 1855).

¶ The constant connections of the hymen with the frame of the urinary meatus, and with the frenum running towards the clitoris, which crosses the vestibulum vertically, have been pointed out since 1834 in my communications to the Société de biologie, and to the Congress at Copenhagen already mentioned. They have been found again by O. Schaeffer (*loc. cit.*), who does not seem to have taken note of my works, and presents his observations as something new. He quite rightly comes to the conclusion that the hymen is an ectodermic production, and he rests this conclusion upon some interesting considerations regarding its structure and its development.

of the whole or of part of the urethra, which may exist alone or coincide in the newly-born infant with persistence or permeability of the uracus, which allows the evacuation of the urine.*

Abnormalities of structure.—The hymen is generally thin, membraniform, and appears to be merely constituted by two slips covered with squamous epithelium being placed back to back, and often becoming fused together and sometimes remaining partially distinct. The variations which it presents as regards structure are: 1st. A greater thickness, rendering it more fleshy without increasing its firmness. 2nd. A peculiar rigidity, rendering it almost sclerosed, and having sometimes necessitated the use of a sharp instrument for its section, penetration having been impossible without this intervention. According to Budin† this rigidity of the hymen may often be the principal factor when the posterior part of the perinæum is torn, by putting an obstacle in the way of progressive dilatation of the vulva; inversely the elasticity of the hymen may be such that only very small fissures are to be observed after a normal delivery.‡ The membrane has been found quite intact after an abortion at the sixth month.§ 3rd. Excessive vascularity of the membrane, which has been the cause of serious and even fatal hæmorrhage when connection first takes place.||

These facts, very difficult to understand if one admits that the hymen is nothing but a fold of the vaginal mucous membrane, become very clear when one considers them as a debris of the organ of the corpora spongiosa (the mucous membrane of the penile portion of the urethra in man), remaining in the embryonic state, and capable, by anomaly, of presenting in the woman some erectile tissue, as it does in the homologous

* Cabrol, in 1555, operated, at Beaucaire, upon a young girl who presented this abnormality.—A curious case of it was published by Middleton. *Amer. Journ. of Med. Sciences*, Jan., 1868, p. 79.

† Budin. *Semaine méd.*, 9th March, 1889.

‡ Budin. Two small fissures of the hymen in a primipara, who had been delivered of a big child (*Progrès méd.*, 1887, t. 6, p. 460).

§ Tolberg's case, mentioned by Dohrn, *loc. cit.*

|| Winckel. *Lehrb. der Frauenkr.*, 1886, p. 80.—L. Ascher. Ein Fall von hochgradiger Blutung nach dem ersten Coitus (*Prag. med. Woch.*, 1889, t. 14, p. 25). The very abundant hæmorrhage was arrested by tamponnement. It was caused by a simple tear of the hymen, which encroached slightly upon the left labium minus and the fossa navicularis.

organ in the man. Henle has, besides, removed any doubt about this last fact, for he has, in some exceptional cases, found some erectile tissue in the hymen.*

Congenital absence.—Any ancient reports of cases of total absence of the hymen ought to be received with mistrust. Probably in most cases they are due to errors, the causes of which I have pointed out. Devilliers,† Tardieu, Brouardel,‡ have never seen any examples of it in the numerous children they have examined for medico-legal purposes.

Hermaphroditism.§—True hermaphroditism (*Ερμῆς* and *Ἀφροδίτη*) ought to be that in which the organs of the two sexes are found united in the same individual, and capable of performing their functions. I shall discuss further on some supposed cases of true hermaphroditism, and shall prove how little they are worthy of consideration. But the appearance of a double sex may be met with in various circumstances, owing to malformations of the genital organs having taken place during their embryonic phase in the man, or else owing to certain parts having become excessively developed in the woman. The individuals belonging to the first class are incomparably more numerous than those of the second, and the great majority of the pseudo-hermaphrodites which have been described and pictured are men with hypospadias. The criterion in determining the sex, in these complex cases,

* What one might call the organ of the corpus spongiosum in the embryo, which turns entirely into erectile tissue in the man, remains as fibro-elastic tissue in the woman, and undergoes no vascular transformation except in its marginal and deeper part. It is owing to this partial transformation that the bulb of the vagina becomes formed (which, joined to the hymen, is homologous to the bulb of the urethra and the verumontanum in man), as well as the intermediary network of Kobelt, which runs from the bulb of the vagina to the clitoris, rendering the male frenum double, and which, with this frenum, is homologous to the corpus spongiosum of the urethra in the man. This last peculiarity, which completes and confirms my investigations, has been very clearly demonstrated by Guinard. Comparison of the external genital organs in the two sexes. Thesis for the licence, 1886. I had also myself modified what had been put too absolutely in my first conclusions, with regard to the bulb of the vagina, very shortly after their publication. (Internat. Congress of Med. Sciences, Copenhagen 1884, t. 1, p. 67-69.)

† C. Devilliers. New investigations with regard to the hymen membrane and the carunculæ myrtiformes. (*Revue méd.*, 1840, t. 2, p. 180.)

‡ Brouardel. Causes of error and rules for experts in cases of attempted rape (*Gaz. des. Hôp.*, Sep. 1887, p. 881). The hymen membrane; its examination and its various forms. (*Ibid.*, p. 901.)

§ The word *Hermaphroditism* would be more correct, but it is less used.

consists in the presence or absence of the testicles or ovaries, and what creates the principal difficulty in certain circumstances, in the living body, is the impossibility of knowing what is the nature of the genital gland, placed in the inguinal canals or hidden in the abdomen.

In order to get a good general idea of hermaphrodisism, I think it as well to establish the following divisions, more from a practical point of view than as a theoretical classification:

1st. Partial pseudo-hermaphrodisism: some only of the peculiarities of one sex are found, while the other sex is obviously predominant. This class includes two varieties: gynanders and androgynes, according to whether the individual belongs to the female or the male sex. 2nd. Properly so-called pseudo-hermaphrodisism, due to perineo-scrotal hypospadias: the external genital organs have an embryonic arrangement, and in consequence belong to the female type; any doubt is removed by looking for the testicles. 3rd. Simulated true hermaphrodisism.

I. *Partial pseudo-hermaphrodisism.*—

A. *Gynandria.*—The external organs of a woman simulate very roughly those of a man when there is any hypertrophy of the clitoris and the prepuce, with blending together of the labia majora or even of the labia minora, simulating the scrotum and hiding the orifice of the vagina from view (fig. 482). The resemblance is still more marked when there is a herniated ovary at the anus or in one of the labia majora.*



Fig. 482.—Partial pseudo-hermaphrodisism in a woman from hypertrophy of the clitoris (Gynandria).

The external genital organs of a small girl of three weeks (natural size; specimen in the Museum of legal medicine at Vienna, presented by Professor Hofmann); the integuments show signs of having been macerated in alcohol for a long time.—The prominent labia majora encircle the clitoris and hide the vulvar orifice. The frenum of the vestibule is very thick.

* Eschricht. Müller's Arch. f. Anat., 1886, Heft 2, p. 139.—Case reported by Boulland and Manec (with autopsy). Journ. univ. et hebdom. de méd. et de chir. prat. et des inst. méd., Paris, 1833, t. 10, p. 467.—Case reported by Debout, in Le Fort. Malformations of the vulva and vagina. Thesis for the licence, Paris, 1863.—

This hypertrophy of the clitoris has often been found in women who practise onanism.

In cases where the labia are glued together,* it is sometimes possible in newly-born infants, to separate them by means of traction with the fingers or some blunt instrument, in the same way that one separates an adherent prepuce from the glands in phimosis. If necessary, a sharp instrument may be used, when one has ascertained the existence of the vaginal passage behind the bridge of skin which has to be divided. This canal and the urinary meatus would in this way be uncovered, as in a case of Huguier's.

Hypertrophy of the clitoris does not change its form, it merely exaggerates its dimensions and those of its hood.

The clitoris has attained as much as 4 or 5 centimetres in length (case of Huguier's). In the specimen which I reproduce, one should observe the notable difference of the male frenum of the vestibule running to the hymen.

The internal genital organs in the woman are occasionally irregular in their form.†

Joseph Marzo's case, which has been published (*Annal d'hygiène et de méd. légale*, 1866, 2nd series, t. 25, p. 180), is doubtful.—J. Simpson (collected works, t. 2, p. 407) has described the genital organs of a small girl which looked like those of the male sex, reported by Ramsbotham (*Med. Gaz.*, 1834, t. 18, p. 184), with account of post-mortem examination. They have been represented by Hart and Barbour. *Manual of gynæcol.*, Fr. trans., 1886, p. 584.—E. Hofmann (*Wien. med. Jahrb.*, 1877, p. 293, et seq.) has published a case similar to the one represented in fig. 483. This last, for the drawing of which I am indebted to that distinguished professor's kindness, was taken from a specimen in the Museum of legal medicine at Vienna, where it is classified under the following title: "Excessive development of the clitoris." The individual was named Henrietta Rupp; it was a rachitic child which died at the age of three weeks from capillary bronchitis. The internal genital organs were normal; there was no other deformity to be observed about the remainder of the body.

* Säger. *Conglutinatio labiorum* (Obstet. Soc. of Leipzig, 20th July 1891, in *Centr. f. Gyn.*, 1891, No. 50, p. 1022).

† Jeannel (*Bull. et Mém. de la Soc. de chir.*, 1887, p. 505) has reported a case where, besides a bicornate uterus, there was exaggerated development of the clitoris.

In the description of the post-mortem examination of Bouillaud, performed by Manec (*loc. cit.*), mention is made of the presence of a prostate, around the urethra, receiving the inferior and contracted extremity of the vagina, which did not open above upon the vulva. This arrangement belongs essentially to the male sex. But the want of any microscopic examination leaves some doubt as to the nature of this supposed prostate. The explanation of this fact is, besides, somewhat faulty in another respect. It is not the vagina which opens thus into the urethra, it is the urethra and vagina which open together into the vestibular canal, vestige of the uro-genital sinus (see fig. 477).

B. *Androgyny*.—Individuals belonging to this class are monorchid or cryptorchid men, offering certain of the external



Fig. 483.—Partial pseudo-hermaphroditism in a man (*Androgyny*).

External genital organs of Jan (Pozzi).

Hypertrophy of the frenums of the prepuce extending along the scrotal raphe as a bifid eminence simulating the free edge of the labia minora. (This young subject presented, besides, well developed female breasts; the left testicle, which was atrophied, was retained at the ring.)

characteristics of women, amongst others an exaggerated development of the breasts. Here one finds in existence the

male type of the external genital organs, since the scrotum is closed up and has placed above it a penis with a glans which is perforated. But the absence of the testicles in the scrotum, the

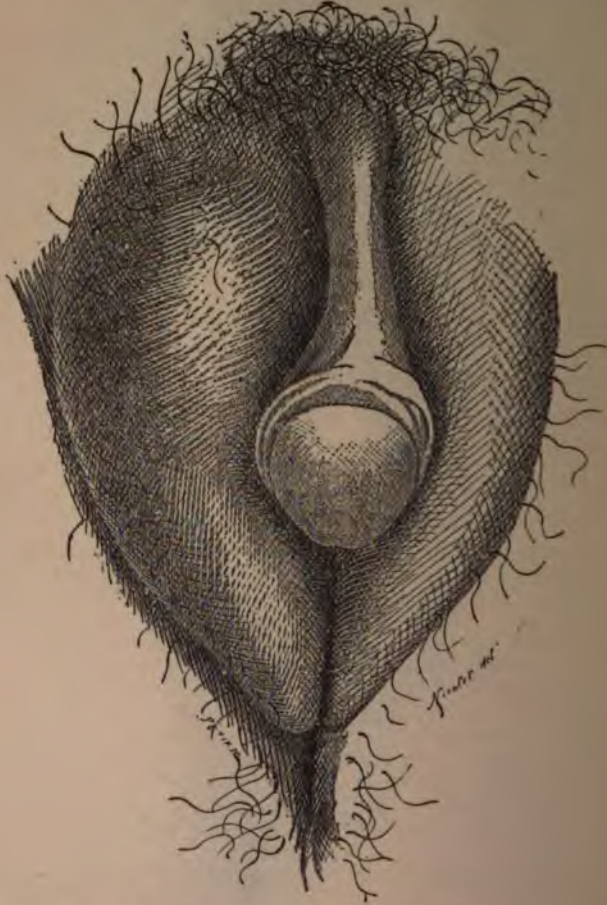


Fig. 484.—Pseudo-hermaphroditism, properly so-called, from perineo-scrotal hypospadias.

External genital organs of Julia D. (a man). (Pozzi.)

Male appearance of the external genitals when the penis is lowered and the thighs are brought together.

slight development of the penis, the median depression in the scrotum, which can be increased and may simulate two labia majora in apposition, the size of the breasts, which may be

developed to the same extent as in a woman, lastly, as in a case which I have observed (fig. 483), the presence of vestiges of the labia minora, forming a crest upon the scrotal raphe, give the individual a female appearance.* The development of the breasts, which in man frequently accompanies any arrested



Fig. 485.—Properly so-called pseudo-hermaphroditism from perineo-scrotal hypospadias.

External genital organs of Julia D. (man). (Pozzi.)

Female appearance of the external genitals when the penis is raised, and the thighs are separated.

b, frenum; *mu*, urinary meatus; *ov*, vulvar orifice.

development of the organs of generation, is a fact belonging to organic sympathy for which there is absolutely no explanation, but which it is interesting to compare with those physiological

* S. Pozzi. Note on two new cases of pseudo-hermaphroditism (*Mém. de la Soc. de Biologie*, 1885, p. 21—29, 1st case).

facts which deal with the connection there is between these organs. The mammary hypertrophy, when it occurs in a case

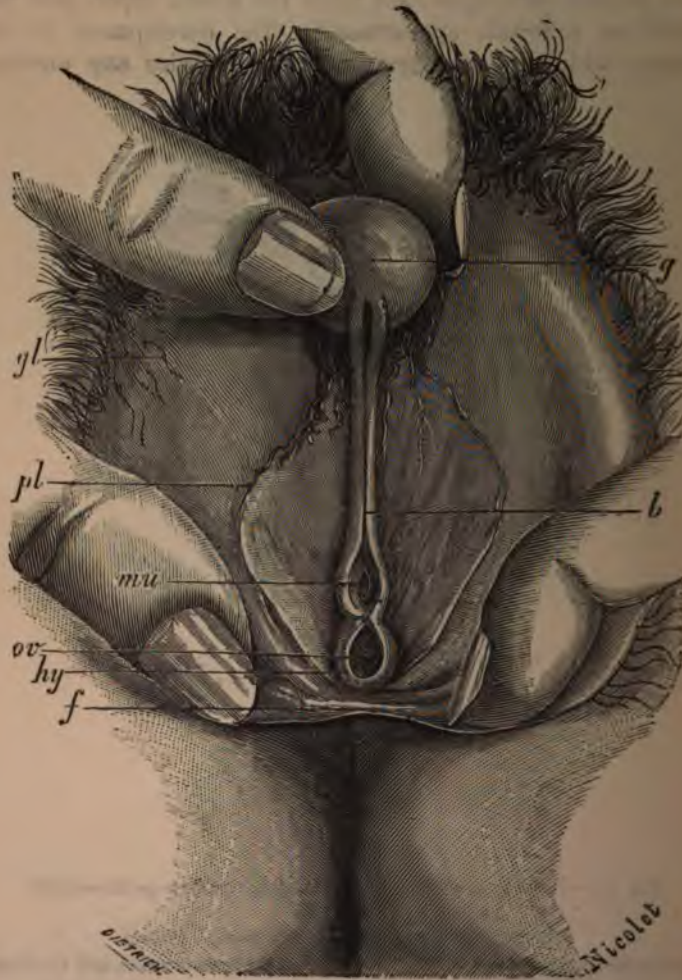


Fig. 486.—Properly so-called pseudo-hermaphroditism, from perineo-scrotal hypospadias.

External genital organs of Louise R. (a man). (Pozzi.)

g, glans; *b*, frenum; *mu*, urinary meatus; *or*, vulvar orifice; *hy*, hymen; *f*, fourchette; *pl*, labia minora; *gl*, labia majora.

where the genital deformity does not quite reproduce the appearance of the vulva, becomes the principal characteristic of pseudo-hermaphroditism.

II. *Properly so-called pseudo-hermaphrodisism.**—The great majority of cases observed belong to this order. They are

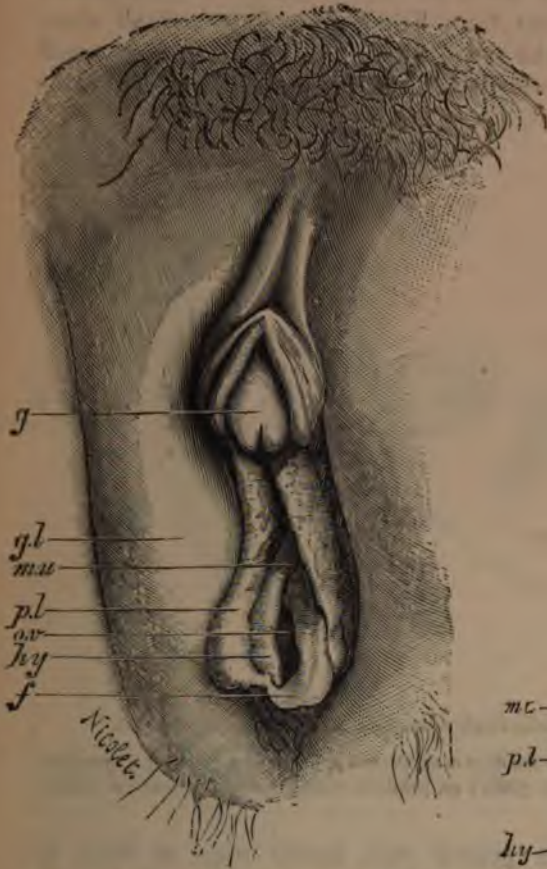


Fig. 487.—Properly so-called pseudo-hermaphrodisism from perineo-scrotal hypospadias.

External genital organs of Julia D. (a man). General view, the thighs being separated. (Pozzi.)



Fig. 488.—Details of the hymen and the frenum of the vestibule in the same subject.

g, glans; *b*, frenum of the vestibule; *mu*, urinary meatus; *pl*, labia minora; *ov*, vulvar orifice; *hy*, hymen; *f*, fourchette.

* Under the name of transverse hermaphrodisism, cases have been described where the external genital organs belonged to one sex (almost constantly the female sex) and the internal genital organs to the other. These are nearly always, in man, cases of perineo-scrotal hypospadias.

men with scrotal rather than with perineo-scrotal hypospadias,* and one has been enabled, by numbers of post-mortem examinations, to ascertain its exact signification. I have myself described three cases from living examples,† and all three belong to exactly the same type, which agreed perfectly well with what had already been said on the subject. These in-

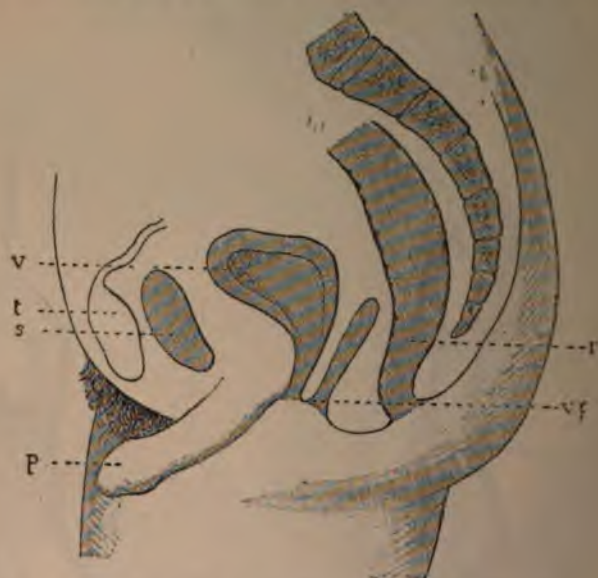


Fig. 489.—Pseudo-hermaphroditism from perineo-scrotal hypospadias.

Diagram intended to show the deep connections: *v*, bladder; *t*, testicle; *s*, symphysis pubis; *p*, hypospadiac penis; *vp*, prostatic vesicle (pseudo-vagina); *r*, rectum (Zweifel).

dividuals are, as a general rule, looked upon at birth as belonging to the female sex, registered as girls,‡ and dressed

* For an account of hypospadias in man see Guyon. Malformations of the urethra. Thesis for the licence, 1863.—Bouisson. Contribution to surgery, 1868, t. 2 p. 500.

† S. Pozzi. Bull. de la Soc. de Biol., 26th Jan., 1884;—Mém. de la Soc. de Biol., 1884, p. 22.—Ibid., 1885, p. 21—29;—Bull. de la Soc. d'Anthrop., 5th Dec., 1889, 2nd series, t. 12, p. 602;—Winter (Zeitschr. f. Geb. u. Gyn., 1890, Bd. 18, p. 159) and P. Petit (Pseudo-hermaphroditism from perineo-scrotal hypospadias, in Arch. d'Obstet. et de Gyn., 1891, p. 433) have published some fresh cases.

‡ Even some experienced observers have been mistaken in this matter, as is proved by a case reported by Polaillon (Bull. et Mém. Soc. Obstet. et Gyn. de Paris, 14th May 1891, p. 123); it was the case of an individual, 25 years of age, shown as a

and brought up as such. A very large number of them have been married; almost all have had connection with men by means of the orifice of the urethra, which becomes hollowed out as an infundibulum, much more than by means of the vulvar depression which exists just above; but at the same time many of them feel attracted by women and indulge in a more or less complete form of coitus. There are cases where irregular menstruation is simulated by some hæmorrhage taking place on a level with the dilated and irritated urethra;* but some undeniable examples of menstruation, feeble and intermittent, it is true, have been observed, and the anatomical condition is really sufficient to account for them.

In their external conformation the genital organs resemble those of an embryo when seen through a magnifying glass. The penis is only slightly prominent; it is at times, as it were, glued to the pubis, and held below by a frenum; the glans is of the size of that of a child or a youth; it is imperforate, but its extremity is marked by a notch or groove, with a small fleshy band which goes from its inferior part and extends towards the perineum. This frenum, which was first of all well described by Bouisson, from a surgical point of view, and was demonstrated by myself as being homologous with the male frenum of the vestibule in woman, extends from the glans to the urinary meatus, situated about one or two centimetres above the root of the penis. Lower down is found the vulvar orifice, which varies in size, being generally very small, hardly allowing the introduction of the index finger. A perfectly formed hymen may exist round the orifice of the vagina. I have seen two examples of this.† What helps to keep it intact is frequently the hyperæsthetic condition of this orifice. The vagina found beyond the vulva has a variable depth, sometimes reaching

woman before the Académie de Médecine. The patient died afterwards in Polaillon's wards, when Professor Cornil examined the two supposed ovaries (*ibid.*, p. 128), and demonstrated them to be two testicles.

* Case of Ernestine G., presented by E. Magitot (*Bull. de la Soc. d'Anthrop.*, 1881, t. 4, p. 487), and Article 2, which I presented to the same Society (*ibid.*, 5th Dec., 1889, p. 602).

† S. Pozzi, *loc. cit.*—Sänger has shown before the Obstetrical and Gynæcological Soc. of Leipzig on Jan. 21st, 1889 (*Centr. f. Gyn.*, 1889, No. 25, p. 440), a supposed woman, remarkably tall, and presenting, although married, the characteristics of a man with hypospadias, as Zweifel pointed out: at the rudimentary vulvar orifice there existed the remains of a crescent-shaped hymen.

more than ten centimetres.* Müller's ducts may even be completely developed in man, in cases of malformation of the external genital organs.

There is to be seen in the Pathological Museum of Würzburg a specimen described by Franqué,† showing the external genital organs of a man (with hypospadias?), and above them a vagina opening into the prostatic portion of the urethra, as well as an uterus with oviducts, all well developed.

Zweifel mentions the case of a child aged six months, whose body was examined after death, when hypospadias was observed with well-formed testicles, but at the same time the vagina, uterus, and tubes had been completely developed from Müller's ducts. Ahlfeld has collected several similar cases. The ejaculation takes place into the interior of this canal during connection.‡ During erection the penis is usually kept curved by the frenum.

The prepuce, open below, resembles the hood of the clitoris in its arrangement; there are rudimentary labia minora and well-marked labia majora. The testicles, which are always rudimentary and which secrete a sterile sperm, like that of the cryptorchids, have sometimes descended, and at other times have remained at the ring or in the abdomen.

The breasts become developed like those of a woman, as do the buttocks and thighs, which have a very thick covering of adipose tissue. The larynx is very slightly prominent, the voice is effeminate; one finds a male pelvis; the beard, which at times is scanty, at others becomes very thick, and when this peculiarity accompanies the female breasts, it is one of the most striking characteristics. Generally, by means of the rectal tactus combined with vesical catheterisation, one can discover no trace of the uterus, nor, as a rule, of the prostate. The existence of the ovaries cannot be detected by bimanual palpation.

These individuals are either weak-minded, or if intelligent,

* Marchand. Ein neuer Fall von Hermaphroditismus am Lebenden beobachtet (Virchow's Arch., 1888, Bd. 92, p. 286.)—See on the subject of the uterus masculinus: Ahlfeld (Missbildungen, &c., p. 250), and an important autopsy published by Adrien Pozzi and P. Grattery (Pseudo-hermaphroditism, in Progrès. méd., 1887, p. 808). One interesting peculiarity noticed in this case is the structure of the male frenum, which under a mucous lining presented some erectile tissue.

† Franqué, mentioned by Kölliker, Fr. trans., 1882, p. 1048.

‡ The vasa deferentia have been found opening under the urinary meatus, by the side of the pseudo-vulvar orifice. Dohrn. Ein verheiratheter Zwitter (Arch. f. Gyn., 1884, t. 22, p. 225).

their mind is not an evenly-balanced one;* besides, there is most often in their nervous system some inherited weakness; analogous deformities have been observed to take place in individuals of the same family.†

III. *Supposed true hermaphrodisism.*—Although it was recognised without any hesitation by the authors of former times, who mentioned numerous cases, none of them at all convincing, true hermaphrodisism is at the present day much questioned.

Klebs has theoretically classified true hermaphrodisism as follows:—

(1) Bilateral: on both sides will be found both the testicle and the ovary, this is what has also gone by the name of vertical hermaphrodisism; (2) unilateral: the testicle and ovary are found on one side only; (3) lateral: a testicle is found on one side and an ovary on the other.

The two first varieties can be rapidly passed over; not a single case of unilateral hermaphrodisism has been mentioned; those of bilateral hermaphrodisism are more than doubtful. I shall principally talk of the cases of lateral hermaphrodisism, which have quite unduly, as it seems to me, served to convince the authors of certain recent works.‡

One can only give any real importance to such facts as were followed by post-mortem examination. The case of Catharina Hohmann, § which has so often been quoted, was not verified in

* The importance of the malformations of the genital organs (microorchydia, cryptorchydia) upon the development of mental diseases has been pointed out by Christian (*Annal. medico-psychol.*, 1882, t. 7, p. 126);—The study of melancholia, obs. 39, p. 134, and by Legrand du Saule. The physical signs of reasoning mania, p. 13.—This subject has been the object of an interesting study by Raffegau. On the part played by abnormalities of the genital organs in the development of madness in man. Thesis for M.D., Paris, 1885.—See also Magnan. On the abnormalities the aberrations, and the perversions of the sexual organs. Commun. to the Acad. de Méd., the 13th January, 1885 (*Progrès méd.*, 1885, p. 49);—Three cases of malformation of the genital organs (*Bull. de la Soc. d'anthrop.*, 17th Feb., 1887).—Madness has been observed (Magnan). The celebrated Alexina B., who was the subject of a remarkable paper written from a psychological point of view by Tardieu (The identity of the genital organs with regard to malformations, Paris, 1872), committed suicide. The complete report of the autopsy on her body was published by Goujon (*Journ. de l'anat. et de la phys. norm. et path. de l'homme et des animaux*, 1869, p. 599). This was a man with hypospadias.

† See the curious genealogy of Jan..., which I reported with Dr. Motet. *Mém. de la Soc. de Biologie*, 1885, p. 24.

‡ M. Langier. Art. Hermaphrodisism in *Dict. of Pract. Med. and Surg.*, 1873, t. 17, p. 504.—A Guinard. Thesis for licence, 1886.

§ Rokitsansky. Ein Fall von Hermaphrodisia vera lateralis (*Allgem. Wien. med.*

this way, as was erroneously stated. It is easy enough, thanks to the details which have been reported of the case, to become convinced that it was a case of pseudo-hermaphroditism from perineo-scrotal hypospadias. The right testicle was alone descended into the labium majus. This individual pretended and seemed to have a regular menstrual flow; but it was later on recognised that this supposed menstruation was due to the practice of a fraud.* Rokitsansky, who was thus imposed upon, believed in the existence of this menstruation, which Schultze had already mentioned as occurring in hermaphroditism, and concluded by induction and purely hypothetically that there were ovaries and Graafian vesiculæ; in a word, that one was dealing with true hermaphroditism. This individual had female breasts.

The very well known case of Heppner's, of St. Petersburg,† held up as a convincing one by the partisans of true hermaphroditism, seems at first irrefutable, since it is based upon a post-mortem examination; but upon looking into it more carefully one sees that it may give rise to very grave doubts. The case was that of a child two months old, presenting external genital organs of the female type or with perineo-scrotal hypospadias. The uterus, the tubes, and the ovaries were well developed and on each side there existed also an additional gland, which resembled a testicle. Between this body and the ovary there was the par-ovarium, or shrivelled up Wolffian body, adherent to the supposed testicle. When microscopically examined by Heppner, this indeterminate body showed the existence of tubes running in the direction of a hilum; these walls were hyaline, without either striæ or nuclei, when acted upon by acetic acid; no vasa deferentia were to be found. It is upon these simple facts that Heppner bases his conclusion as to the nature of the organ.

Zeit., 1868, t. 13, p. 225). This article has been completely, but rather incorrectly, translated in the *Union méd.*, 1866, p. 498.—See also on this same case: *Allg. med. Centralzeit.*, Berlin, 1868, p. 492, and *Virchow's Arch.*, 1869, Bd. 48, p. 329, and *ibid.*, 1869, Bd. 45, p. 1.

* Ahlfeld (*loc. cit.*, p. 225) mentions the great tendency these individuals have to deceive any medical man. Catharina H. used every month to suffer from epistaxis, and took advantage of it to smear the genital organs with blood.

† C. L. Heppner. Ueber den wahren Hermaphroditismus beim Menschen (*Arch. f. Anat. Physiol.*, &c., 1870, p. 687). An analysis has been given by Doumic. *Gaz. méd. de Paris*, 1872, p. 290. This case has been very incorrectly reported. One should observe that the specimen examined had been lying in spirit for several years.

Slavjansky would not own that he was convinced that they were not ovaries; it is a known fact that Beigel pretty frequently found supernumerary ovaries. In support of this conclusion one ought to mention the great analogy between the primary structure of the ovary and that of the testicle, and the excessive delicacy of their differentiation (Zweifel).

The autopsy on the supposed true lateral hermaphrodite of Meyer's* gives rise to the same objections. The small body resembling an ovary, found on the left side, was apparently nothing but an atrophied testicle; the large cells then observed by Klebs were, no doubt, only male ovules; he found it impossible to discover any Graafian follicles.

These three cases are the principal examples which have been brought forward in support of true hermaphrodisism in man. I cannot dwell at any length upon the other cases, which are either of too early a date to have any value on account of their histology, or too incomplete to be trustworthy.†

To sum up, there is actually not a single asserted example of true hermaphrodisism with co-existence of the ovaries and testicles

* Hermann Meyer (of Zurich). Ein Fall von Hermaphroditismus lateralis (Virchow's Arch., 1857, t. 11, p. 420).—Klebs. Handbuch der Path. Anat., Berlin, 1876.—See for the detailed account of this case: J. Garrigues. Amer. system of gynaecology (edit. by Mann), t. 1, p. 275.

† Berthold (Abhandl. der königl. Gesellsch. der Wissensch. zu Göttingen, 1845, Bd. 2, p. 104) found in a newly-born child affected with hypospadias a testicle on one side, and what was supposed to be an ovary on the other; this body, in which he failed to discover any follicles, was undoubtedly the second testicle, which was atrophied.

A. P. Banon. Dublin Quart. Journ. of Med. Sciences, 1852, t. 14, p. 66: same remarks as above.—See for this case Ahlfeld (*loc. cit.*), as well as for the criticisms on the other former observations of Sue, Maret, Varochier, Rodolphi, Stark, Barkow, Gruber, Klotz.

These are to be seen in the Dupuytren Museum, two specimens having relation to supposed cases of true hermaphrodisism; specimen No. 264 is a wax model by Lemonnier, representing the external genital organs of an individual whose internal genital organs are in a like manner reproduced after death in wax, specimen No. 265. In the description of these specimens is found the following remark: "To the complete genital apparatus of a woman are found superadded two testicles and two vasa deferentia, which take the place of the round ligaments." It seemed to me that one was dealing here merely with a double hernia of the ovary into the labia majora. Houel, the former curator of the museum, whose opinion I asked on this specimen, characterised it as one originating in "pure imagination." Specimen No. 267 B is thus described: Neuter hermaphrodisism, Angélique Courtois (dissection in spirit). "This hermaphrodite, adds the notice, observed by M. Follin, has the external genital organs of a man and the internal genital organs of a woman, and the deeper genital organs of the two sexes." (Follin. Gaz. des Hôp., 4th Dec., 1851, p. 561.)—This case seems to me one of simple hypospadias, with an atrophied testicle.

in man. Yet this abnormality does not seem *a priori* impossible. It is an arrangement frequently found in fishes and the batrachia.* It is even the rule in the toad. But it seems to be very rare in the higher vertebrate animals. Yet true hermaphroditism has been come across in the goat† and the pig‡. Hypospadias with pseudo-hermaphroditism has been more frequently observed, and I have seen a good example of it in the dog.

Treatment.§—The various malformations which I have enumerated are most of them more interesting to the anatomist than to the surgeon, and active intervention is rarely required.

When the labia are glued together, they should be pulled apart, a knife being used if necessary.

Hypertrophy of the labia and the clitoris may require amputa-

* An ovary and a testicle are frequently found on the same side in the genus of fish *serranus*, and a little less frequently in the herring, the cod, &c. However strange it may seem, true hermaphroditism is the normal condition of the toad (*Bufo vulgaris*) and it is very frequent in the red frog (*Rana temporaria*). In the male of this last species, one finds on each side a testicle surmounted by an adipose body with a duct which acts both as vas deferens and as ureter. The seminal vesicles exist as well as Müller's ducts; these latter, which in the female become enlarged and form the oviducts, are found as delicate bands in the female, carrying the vesiculæ seminales above the lung (Bland Sutton).

The vesiculæ seminales of the frog seem, on a cursory examination, to be simple dilatations of Müller's duct, but they belong in reality to the Wolfian duct.

In the toad, between the testicle and the adipose body, there is to be seen a small special organ called the *organ of Bidder*, after the first person to describe it; this organ, according to the most recent works, is simply a rudimentary ovary, and it seems to exert a very remarkable influence upon the high degree of development of Müller's ducts in the male toad. In the frog, the Müller's ducts of the male are as a rule hardly visible, but owing to a frequent abnormality the male frogs may also present an *organ of Bidder*, or rudimentary ovary, by the side of a testicle, forming a true *ovo-testis*; at the same time one may then see Müller's duct or oviduct become very considerably enlarged. Their development is thus in direct relationship with the volume of the *organ of Bidder*. To sum up, the *ovo-testis* (true hermaphroditism) forms the rule in the toad and a frequent malformation in the frog. J. Bland Sutton. Diseases of the lower animals. (Trans. of the Path. Soc. of London, 1885, p. 509).—A. F. S. Kent. A case of abnormal development of reproductive organs in the frog (Journ. of Anat. and Physiol., June, 1885, t. 19, p. 847).

† F. Schnopphagen. Wien. med. Jahrb., 1878, Heft 3, p. 841.

‡ V. Kolliker. Ueber einige Fälle von Hermaphroditismus beim Schweine (Transactions of the Period. Internat. Congress of Med. Sciences, 8th session, Copenhagen, 1884, t. 1, p. 47). Two of these are simple cases of hypospadias in the male, with development of a vagina and bicornate uterus, with imperforate tubes. In a third case there was true lateral hermaphroditism (a testicle and an ovary), bicornate uterus, and external genital organs of the female type. These facts have been the subject of a paper by J. Reuter, Inaug. Address, Würzburg, 1884.

§ For the operations required by vaginal atresia of the anus and all its varieties, I refer the reader to works on general surgery.

tion of the exuberant parts, especially if the irritation produced by contact with the clothing causes any pain. For this operation a cutting instrument may be used with the help of a local anæsthetic, such as cocaine. The hæmorrhage will have to be controlled by a continuous suture, by forcipressure, and, if necessary, by applying the thermo-cautery to the corpus cavernosum of the clitoris.

In *epispadias* the parts should be sutured after paring the edges to suit the shape and the size of the fissure, as Roser,* Schröder,† Dohrn,‡ Richelot,§ have done. In one case Testelin|| was able to produce the occlusion of a canal which existed above the urethra by the repeated application of caustic potash; but this does not seem to me to be a means to be recommended.

Malformations of the hymen may require to be incised or partially resected.

Can *pseudo-hermaphrodisism* require any surgical interference? In one of the cases I observed, as the frenum under the penis caused considerable inconvenience during erections, I was asked to destroy it. A simple section would here be sufficient; the frenum ought to be excised, and afterwards a plastic operation should be performed. I was intending to do this small operation when all at once the patient objected to it.

* Roser. Würtemb. Corresp., 12th June, 1861.

† See Moricke, *loc. cit.*—Frommel, *loc. cit.*

‡ Dohrn. Zeitschr. f. Geb. u. Gyn., 1886, Bd. 12, Heft 1, p. 1.

§ G. Richelot. Union méd., March, 1887, 3rd series, t. 48, p. 365.

|| Testelin. Gaz. méd. de Paris, 1861, p. 733.

CHAPTER II.

MALFORMATIONS OF THE VAGINA AND THE UTERUS.

Short account of the development of the vagina and uterus.—Etiology and pathology of the vagino-uterine malformations.—Malformations of the vagina. I. Complete absence and rudimentary development. Morbid anatomy and symptoms. Treatment. Castration. Creation of an artificial vagina. Electrolysis. II. Unilateral vagina. III. Vagina with a septum. IV. Atresia and congenital stenosis. Transverse bands.—Malformations of the uterus. I. Absence of the uterus. Rudimentary development of the uterus. Absence and atrophy of the cervix uteri. II. Single-horned uterus. III. Double uterus: 1st. Double horned uterus; 2nd. Bilocular uterus; 3rd. Didelphous uterus. IV. Foetal or infantile uterus. V. Small abnormalities of the uterus. Congenital obliquity and latero-position. Double external orifice of the cervix. Incomplete transverse septum of the cervix.

Development of the vagina and the uterus.—The whole of the genital canal, including the tubes, uterus, and vagina, is formed from Müller's ducts. The uterus and vagina are developed from the inferior segments of the ducts comprised between the urogenital sinus and the Wolffian insertions of Hunter's ligaments, or the round ligaments. These inferior segments become fused together in the median line into a single canal, known under the name of *genital canal* (Leuckart), or *utero-vaginal canal*; their upper or diverging parts, situated between the summit of the genital cord and the round ligaments, become the uterine horns. Normally, these horns are only slightly marked in the human species, being, so to say, absorbed in the body of the uterus owing to its ulterior development. But if the space comprised between the insertion of the round ligaments and the summit of the genital canal is reduced to nothing, as happens to be the rule in certain animals, and an exceptional anomaly in the woman, the body of the uterus becomes diminished or suppressed: the organ then becomes developed at the expense of the horns, which take on a predominant importance and open with two distinct orifices into the vagina; this is what happens in the

rabbit, the hare, the squirrel. Should the limit between the vagina and the uterus happen to be increased, owing to the insertion of the round ligaments a little above the top of the genital canal, the condition may give rise to a small uterine body. But the uterus will be very distinctly bicornate; and such is the case in the rat and the guinea-pig. Lastly, the body of the uterus will be all the more considerable when the utero-vaginal limit occurs at a greater distance from the summit (flesh-eating, pachydermatous, ruminant, soliped animals, &c.). In the order of the cheiroptera, the uterine horns are found much elongated; they disappear in the monkeys. In the case of the human type, this simple arrangement of the uterus is found in its highest degree in the normal state;* but a whole series of malformations may arise from embryonic conditions, reproducing by *reversion* (Darwin) the various types which I have been indicating in the animal scale.

One ought also to bring together certain abnormalities presented by comparative anatomy. In most of the marsupials (*Didelphys dorsigera*), Müller's ducts do not become glued together, but remain isolated, and give rise to two uteri and to two vaginae, which open by two distinct orifices into the vestibule. At other times the two vaginae, separated in their middle portion into two perfectly distinct canals, become fused together at their upper part, which receives the two uteri, as well as at their lower part, which opens into the vestibule (*halmaturus*).† Traces of the original internal division of the genital canal exist to a more or less well-marked degree in all animals, with the exception of man and monkeys. In many of the rodents, hares for instance, there is thus a double uterus and a double vagina. In others, such as the mouse, the septum is only found in the upper portion of the uterus.

* In the human foetus the uterus is bicornate up to the third month of embryonic life (Meckel, J. Müller, &c.); but one can already observe the presence of an appreciable space where the uterus will be developed, which is destined to absorb and efface the horns. In fact, from the beginning of the fourth month in the human foetus, the distance between the insertions of the round ligaments is 4 millimetres, whereas the breadth of the fundus of the uterus does not exceed 2 millimetres. Tournoux and Legay. Essay on the development of the uterus and the vagina (Journ. de l'anat. et de la physiol. norm. et path., 1884, p. 330).

† In the marsupials, the obstacle placed in the way of the fusion of Müller's ducts results from the special disposition of the ureters, which, instead of surrounding the whole genital cord, become engaged in Müller's ducts and prevent their coalescence.

The foregoing remarks help to explain malformations of the vagina and the uterus just as much as they complete and make clear certain questions of human embryology. It is not only in comparative anatomy, but also in teratology that phylogeny should be associated to ontogeny. Some notions regarding this latter will enable one to account for the various stages gone through by the genital canal in its development, and the arrests which may take place.

Müller's ducts, which lie parallel in the genital cord, become fused together throughout its whole length, with the exception of the lower end, to which I shall refer again, at the commencement of the third month. At this time the genital canal does not yet show a trace of any division into uterine and vaginal portions, and it is lined with the primary epithelium of Müller's ducts. The whole inferior portion of the genital duct is still devoid of any opening, and the opposite walls of the future vagina are glued together, as are those of the eyelids and the prepuce, which become formed at the same time.*

At the end of the third month one finds the lumen of Müller's duct, on a level with the vestibule, gradually increasing in size the farther it is from that organ; the two Wolffian ducts run along the lateral walls of the utero-vaginal canal and open out into the vestibule behind the urethra. This duct, which was divided by a complete septum up to the level of the vestibule, becomes single owing to the septum gradually disappearing, this taking place from below upwards. This process is complete at the fifth month. The true differentiation of the genital canal into uterus and vagina begins at the end of the third month with the appearance of the cervix uteri; a month later its prominence is conspicuous.†

* R. Geigel. Ueber Variabilität in der Entwicklung der Geschlechtsorgane beim Menschen (Verhandl. der phys.-med. Gesellsch., Wurtzburg, 1883, n. s., t. 17, p. 1).

† Dohrn. Zur Kenntniss der Müller'schen Gänge und ihrer Verschmelzung (Sitzungsber. der ges. Naturwissensch. zu Marzburg, 1865).—The cervix begins to be developed between the fifteenth and sixteenth week from the anterior lip: a round prominence budding out posteriorly pushes the posterior wall of the vagina back, and this latter itself, a short time after, gives rise to the posterior lip just above the depression.—Tourneux and Legay (*loc. cit.*) maintain, on the contrary, that the os tincæ is not formed by a thickening of the internal wall of the genital canal, but that it is the striated squamous epithelium of this canal, which by its budding outwards and upwards gradually carves out from the thickness of the wall the vaginal portion of the cervix.

The internal surface of the uterus remains uneven and corrugated during the whole foetal period. It has upon it the folds caused by the arbor vitæ, which seem to reach to the depth of the organ, as they occupy the whole of the body and the fundus is not developed; this latter, in fact, only becomes formed a little later by a sort of thickening of the space comprised between the tubes. These latter, which at first are provided with nothing but a simple orifice, gradually acquire a fringed extremity.

We have no definite knowledge of the way in which the inferior portion of the vagina is developed. Hoffmann* had already advanced his theory of the Wolffian ducts taking part in its formation; Tourneux and Legay† again maintained a similar theory, which seemed very doubtful. But it seems to me that there can be no doubt, from the frequency with which in teratology one sees the existence of a very short vestibular canal coinciding with the absence of the Müllerian vagina, that the region which one might call, with Legay,‡ the vestibular canal, and which one usually mistakes for the vagina, is independent of it, so far as its embryology is concerned. This region, which becomes almost obliterated in the adult from the vulva altering its shape and becoming heaped up owing to coitus and parturition, is very clearly seen in small girls, and extends in them from the internal edge of the labia majora to a spot one millimetre above the hymen. I am inclined to think that it is the vestige of the uro-genital sinus. At any rate, from a strictly anatomical point of view, this short region is entirely

* v. Hoffmann. Congress of German Physicians and Nat. (Centr. f. Gyn., 1878, No. 21, p. 503).

† Tourneux and Legay, *loc. cit.*

‡ The meaning of the words uro-genital sinus has undergone certain variations according to various authors.—Joh. Müller (*Bildungsgeschichte der Genitalien*, &c., Düsseldorf, 1830) has thus called the anterior portion of the cloaca, detached as a tube-shaped duct from the posterior part of the intestine, and receiving, at its upper extremity and all close together, the ureters, the Wolffian ducts, and Müller's ducts.—Valentin (*Handbk. der Entwicklungsgeschichte des Menschen*, Berlin, 1835), suggests replacing the name of *sinus uro-genitalis* by *canalis uro-genitalis*. This name, which has often been employed since then, is really more exact.—Köllicker (*Treatise on embryology*, Fr. transl., 1882) and his pupils reserve the name of uro-genital sinus for the inferior portion of the sinus to that which is common to the urethra and to the utero-vaginal duct in the woman.—Ch. Legay (*The development of the uterus up till birth*. Thesis, Lille, 1884) proposes very wisely to call it the vestibular canal.

distinct from the vagina, and should rather be looked upon as a portion of the urethra, which has become broader and receives the Müllerian duct. It is this vestibular canal which constitutes, by its enormous prolongation, the major portion of the pseudo-vagina of the pseudo-hermaphrodites (males with hypospadias). One can thus conceive that such an individual may be provided with a hymen, which has, I believe, an ectodermic and not a Müllerian origin.

The hymen, according to those who uphold the most generally accepted theory, by which the whole vagina is derived from Müller's ducts, is formed by a sort of invagination of these canals in the uro-genital sinus. It appears rather late, Dohrn* fixes the time of its appearance at the commencement of the nineteenth week. According to Tourneux and Legay, this membrane results rather from the transformation of the primary swelling, dependent on the posterior wall of the uro-genital sinus, which Müller's ducts pass through to open into this sinus, or rather to give the epithelium lining the sinus the support of their own coating of epithelium. I have already summarily indicated (p. 442) that this membrane does not form an isolated diaphragm, but joins a perfect little hymeneal apparatus which is homologous to the embryonic representative of that portion of the urethral mucous membrane which gives rise to the corpus spongiosum of the urethra in the male sex.† In any case the hymen only assumes its characteristic form and becomes prominent in the vestibular canal when the vagina becomes dilated by the accumulation of pavement epithelial cells, which towards the end of the fifth month fill it so that it resembles a pudding stuffed with caseous matter. At this time the folds of the vagina and the prominence of its columnæ are continued over the posterior surface of the hymen, which condition has contributed to confirm the idea that these two

* Dohrn. *Loc. cit.*

† There is much similarity between the idea of the hymen being homologous to the verumontanum in man and my own conception. In fact the verumontanum is a non-erectile portion of the matrix tissue still in the embryonic state, being a dependence of the urethral mucous membrane, at the expense of which the corpus spongiosum of the urethra has been developed, and which I call, for more precision, the organ of the corpus spongiosum. The homology of the hymen and the verumontanum has been supported by H. Meckel (*Zur Morphologie der Harn und Geschlechtswerkzeuge der Wirbelthiere*. Halle, 1848) and by R. Leuckart, *Wagner's Physiol.*, 1853, t. 4, p. 706 et seq.

membranes are absolutely counterparts. One frequently sees in embryology certain parts with a different origin having one continuous covering, and it is merely a secondary event in the course of development. The formation of the hymen is essentially different from that of the vagina; there are, especially, no smooth muscular fibres to be observed. O. Schaeffer has demonstrated that it was primarily formed of two independent slips which only become united after the fifth month. The superior membrane is alone a prolongation of the vagina, and certain facts in teratology tend to prove that the portion of the canal situated immediately above the hymen, which it lines and thus joins to the Müllerian vagina, has in reality an ectodermic origin, and forms the upper part of the vestibule.*

At birth the uterus is still appreciably different in appearance from what it will be in the adult state. The cervix forms its principal part, and the fundus seems to be simply a dependence of it; the length of the cervix is double that of the body, and its walls are much thicker. The *os tinæ* is large, the anterior lip sometimes extends beyond the posterior lip, and this arrangement, like a tapir-snout, is often found in the adult as a vestige of foetal life which has not disappeared. If one separates the two anterior and posterior walls by dividing the lateral borders of the uterus, one will notice on each of them the presence of a longitudinal ridge or spine, from which, as from an axis, the folds start obliquely in an upward and outward direction; these ridges, which begin quite close to the vaginal orifice of the cervical canal, extend to within half-a-centimetre of the fundus of the uterus, and they fit into corresponding grooves on the opposite wall, which is thrown into transverse furrows by the *arbor vitæ*. The anterior axis is to the right, the posterior to the left.† I lay stress upon this arrangement so as to make a difference between the varieties of arrested development or of hypoplasia, which are closely allied, but which there is no real need to

* Such a thing as a circular hymen has been seen, situated one millimetre below a double vagina and independent of the vertical partition; in the numerous cases of absence of the inferior opening of the Müllerian vagina, generally mistaken for atresia of the hymen, one has observed an intact hymen placed in front of an obturator membrane, which evidently corresponds with the imperforate terminal portion of Müller's ducts, so that the hymen is situated in the vestibular canal, near its upper limit, but does not form it.

† Guyon. On the cavities of the uterus in the empty state. Thesis for M.D., Paris, 1858.

separate : the *fœtal uterus*, in which the arbor vitæ presents the appearance which I have just described ; and the infantile uterus, in which the arbor vitæ ceases at a greater distance from the fundus of the uterus, and in which there exists a clearer demarcation on the internal surface of the organ, between the cavity of the cervix and that of the fundus. These distinctions, which are interesting from a purely theoretical point of view, have no practical importance.

During the first years of life the uterus does not seem to grow to the same degree as the remainder of the body. The life of this organ remains, so to say, latent until the time of puberty. Then, on the contrary, rapid changes in volume and shape take place. It is more especially the fundus which is affected by this increase in growth, and the result is that it soon considerably predominates over the cervix, which returns to a state in which it is but an appendage, having become half the size of the body and much less thick. At the same time the folds of the uterine cavity become effaced and the relief formed by the upper orifice becomes well marked.

It is interesting to observe that this complete development of the uterus may not come to an end at puberty, and that even pregnancy may take place, in exceptional cases, before its accomplishment.*

With the object of making more intelligible the classification of malformations resulting from an arrested development, one may, with L. Fürst,† make five divisions in the period of embryonic life :

First period, from fecundation to the fifth week.—This comprises the period which one might call indifferent, when the atrophy of Müller's ducts or of the Wolffian body does not point to a move being made towards either one sex or the other. Müller's ducts are adhering together and have a partition between them. There exists a cloaca into which the intestine and uracus open. The genital tubercle and the genital furrow are also devoid of any signs pointing to the sex.

Second period, from the fifth to the twelfth week.—At the

* P. Müller. *Mangelhafte Entwicklung des Uterus* (Deutsche Chir., Lief, 55, 1885, p. 278).

† L. Fürst. *Monatsch. f. Geb.*, 1867, Bd. 80, p. 108.

end of this period the partition in the genital canal has entirely disappeared, the fusion of Müller's ducts is continued higher up, the insertion of the round ligament separates very distinctly what will be the tube above, from what will be the uterine horn below. It is at the end of this period that the cloaca becomes divided into the anal portion and the uro-genital portion.

Third period, from the twelfth to the twentieth week.—The horns of the uterus are fused together. The arbor vitæ has appeared in the cavity of the organ, whilst the vagina is still smooth. The neck of the uterus is formed. The perinæum has become broader. While the vagina has been developing, the uro-genital sinus, after remaining stationary, has become accessory, so that the bladder seems now to open into the genital canal. The uro-genital canal is henceforth the vestibule of the canal in which the hymen appears as a prominence. The genital tubercle is reduced to the proportions of the clitoris, the edges of the genital furrow have formed the labia minora.

Fourth period, from the twentieth week to the end of the fetal period.—This is marked by the formation of folds in the vaginal mucous membrane and in the neck of the uterus, and by the development of the fundus of the uterus.

Fifth period, from birth to puberty.—The uterus increases a little in thickness; about the sixth year the mucous membrane of the uterus, which up till then was in folds, now becomes smooth, and only one single vertical fold remains.

Ætiology.—Pathology.—The malformations of all the organs have long been looked upon as simple freaks of nature. The first attempts to give a rational explanation, based on arrested development, are due to Meissner* and to Busch,† but it is A. Kussmaul‡ who had most to do with developing these ideas and getting them recognised by an important work, which caused his predecessors to be forgotten. In France this new classification was first pointed out by

* Fr. L. Meissner. *Die Frauenzimmerkrankheiten*, Leipzig, 1843, t. 1, pp. 343 and 535.

† W. H. Busch. *Das Geschlechtsleben des Weibes*, 1873, Bd. 3.

‡ A. Kussmaul. *Von dem Mangel der Verkümmernug und Verdopplung der Gebärmutter, von der Nachempfangniss und der Uterwanderung des Eies*. Würzburg, 1859.

Le Fort.* Since then numerous observations have been published, either singly or in works, by several authors.† Fürst had a good deal to do with determining the exact period of development in the embryo to which each abnormality belonged.

What is the initial cause of the abnormalities of the genital organs? Ought one to recognise an arrest of development, or go further back to some superior cause, such as atavism, reproducing sporadically in one species the forms of another species, a phenomenon to which Darwin has given the name of reversion? I shall merely mention this interesting question in passing.

The predisposing causes are very obscure. There is no doubt that heredity often plays a part, however much the fact may appear to be paradoxical when it is brought forward as having anything to do with cases of absence of the uterus. Squarey‡ mentions the case of three sisters who had never menstruated, and whose three aunts were sterile.

In the great majority of cases the immediate cause, or the anatomical condition producing the malformation, is a simple arrest in the morphological evolution or the growth of the organ. It is important to clearly distinguish these different parts. In the first case the organ, while still presenting the appearance it has during foetal life, may have the dimensions proper to adult life; in the second case, which may exist alone or in combination with the first, the organ having acquired the adult type, is affected by aplasia and has remained smaller, either in all or in certain only of its various parts.

Lastly, there are certain facts which one only seems able to explain by supposing some true pathological process to have set up adhesions or blended the parts together during foetal life. To this order belong certain vaginal bands and also the peritoneal band running from the posterior wall of the bladder to the anterior surface of the rectum, which has been found in several cases of bicornate uterus. In truth one ought to be very slow in accepting any such explanations too readily, which tend

* L. Le Fort. Defects in the conformation of the uterus and means of remedying them. Thesis for the licence, Paris, 1863.

† See especially P. Müller. *Loc. cit.*—Las Casas dos Santos. *Missbildungen des Uterus* (Zeitschr. f. Geb. u. Gyn., 1888, Bd. 14, Heft 1, p. 143).

‡ C. E. Squarey. *Obstet. Transact. Lond.*, 1873, vol. 14, p. 212.—Some analogous cases have been mentioned by Hauff and Phillips (Schröder. *Dis. of the female gen. organs*, French transl., p. 37).

only to make one dispense with any other investigation. In cases of vaginal adhesions, the influence which has been attributed to some morbid process may be contested, and one may raise the question of arrested development, since at one time the lumen of this canal does not exist. As to the peritoneal band which passes above the bicornate uterus, it is just as natural to look upon it as one of the effects, as to look upon it as one of the causes of the malformation.

Malformations of the uterus and of the vagina are frequently found in combination. Thus one may observe simultaneously one segment of the genital canal completely absent, with the other in a rudimentary state of development. At the same time, since these anomalies may exist separately, it will be truly interesting, from a clinical point of view, to devote distinct chapters to the description of the defects in development both of the vagina and of the uterus.

MALFORMATIONS OF THE VAGINA.

I. *Complete absence and rudimentary development. Morbid anatomy and symptoms.*—There is a radical difference to be found between these two varieties when one studies the anatomy of the parts, but it is not so clear when one comes to look at them from a clinical point of view. In complete absence there is no trace of the vaginal tissue placed midway between the bladder and rectum. When the development is rudimentary in character, there are some fibrous bands of connective tissue found running in the direction which ought to be occupied by the vagina.

The uterus may be entirely absent, or it may be found reduced to a small rudimentary nucleus.* In other cases it is normal, the ovaries are present, but there is no menstrual flow. Still more exceptionally, they periodically give rise to pains while ovulation is taking place. L. le Fort has observed a case in which the uterus was present, and where very sharp pains occurred at each menstrual period, accompanied by hæmorrhage from the conjunctivæ, while the skin of the legs became cracked

* v. Swiecicki (Wien. med. Blätter, 1891, No. 6, p. 85) has pointed out in one case the absence of the vagina, the uterus, and the left ovary.

or the patient suffered from hæmoptysis.* Complete absence of the vulva † as well as of the vagina has been seen. Most often, however, it is well formed, and there is even a little depression like an infundibulum, situated further back than the labia minora, which are found well formed; the hymen has been

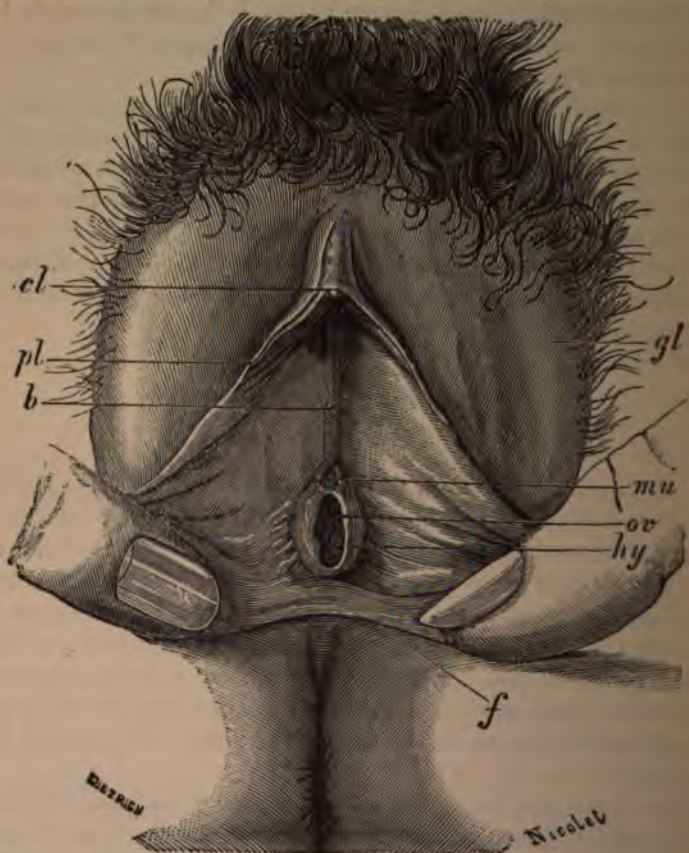


Fig. 490.—Absence of vagina and uterus (or rudimentary uterus?) with a well-developed hymen.

frequently seen to be perfectly normal (fig. 490). The urethral canal is at times dilated during attempts at coitus.

* L. Le Fort. *Manuel de méd. opér. de Malgaigne*, 9th edit., 1889, p. 702.—R. Frommel (*Münchn. med. Woch.*, 1890, No. 15, p. 263) has published a case which owing to the pains was analogous to that of Le Fort's.

† Polaillon. *Bull. et Mém. de la Soc. de chir.*, 23rd March, 1887, p. 204.

There are two important varieties to be distinguished, depending upon whether this complete absence or this rudimentary development of the vaginal canal affects its whole length, or one portion of it only. We know that when the vaginal cavity is evolved from the ducts of Müller, the change goes on always from above downwards.* It is difficult, therefore, to conceive how it should be the inferior part of the vagina which exists the most frequently, rather than the upper part, when there is any arrest of development. I believe that what one ought to look for here is the abnormal persistence and elongation of the vestibular canal, or anterior portion of the uro-genital sinus. This sort of ectodermic mouth, which is insignificant enough in the normal state, re-acquires in this case the same preponderance which it had during foetal life, before becoming pushed back and out-distanced owing to the development of the Müllerian duct. This cul-de-sac, which one so frequently finds in cases of absence of the vagina and uterus, is 2 or 3 centimetres long, and is fairly broad, but not sufficiently so to allow the introduction of the finger. Both the length and the breadth may, however, become considerably increased owing to the practice of coitus. The vestibular cul-de-sac is closed by a shining, reticulated membrane, which has the appearance of a cicatrix.

The middle portion of the vagina has been found wanting, the two remaining portions being separated by a membrane of variable thickness, which is at times perforated; no doubt the Müllerian vagina has then suffered from arrested development, and there has been compensatory development of the vestibular canal, which has gone towards it, but has not succeeded in becoming fused with it. These two canals have also been found encroaching one upon another, and overlapping without opening into each other. If one admits in such a case that one of Müller's ducts is obliterated above and the other below, it is propounding a most unlikely hypothesis.† The one which I have just proposed seems much more natural.

One should always have recourse to a careful digital examination of the rectum, combined with the use of the catheter, or even with digital examination of the bladder, which is some-

* Richard Geigel, *loc. cit.*—F. Tourneux and Ch. Legay, *loc. cit.*

† Schröler. Diseases of the female gen. organs, French transl., 1886, p. 497.

times made easier owing to the urethra being dilated after abnormal coitus, or which can be rapidly completed by using Hegar's bougies. One will thus be able to rupture the fibrous cord which exists in cases of rudimentary development, and which may act as a valuable guide during the operation. In cases of absence, or of rudimentary condition of the uterus, by means of rectal tactus one will be enabled to feel the sound, not only below but also above. The ovaries should be carefully sought for by abdominal palpation, combined with rectal tactus. The patient should always be put under the influence of chloroform for such an examination.

Treatment.—The treatment of absence of the whole or of part of the vagina differs very much according to the state of the uterus. Should the organ be well developed at the time of puberty, certain phenomena will occur in connection with hematometria requiring some interference, which I shall have to refer to farther on.

Should there be no uterus, but merely well-developed ovaries, the dysmenorrhœa which comes on at the time of ovulation may be a sufficient reason for one to perform castration. This operation has been done successfully several times.*

There are still to be mentioned the cases in which there is but one single deformity or infirmity connected with the sexual organs, and in which the woman requires a vagina to be formed merely for the purpose of coitus. Is one justified in trying to create an artificial vagina *pro formâ*, and without any special symptom or sign of there being retention? The question has been decided in various ways. Schröder, Hegar and Kaltenbach are inclined to say one should not do so, pointing out the dangers of the operation, and the risk one runs of going astray and wounding the neighbouring organs when there is no uterus to act as a guide. But Le Fort † has judiciously observed that there are circumstances in which an operation performed to satisfy the patient may become an operation of necessity.

* Las Casas dos Santos (*loc. cit.*) mentions the operations performed by Tauffer, Langenbeck, Peaslee, Savage, Kleinwächter.—Duvelius (Obstet. and Gyn. Soc. of Berlin, in Centr. f. Gyn., 1889, No. 9, p. 148) reports an operation of this sort. The ovaries, removed by A. Martin, contained corpora lutea and cicatrices.

† Le Fort. Manuel de méd. opérat. de Malgaigne, 9th edit., 1889, t. 2, p. 698.—Two other cases are due to Max Strauch. Zur castration wegen functionirenden Ovarien bei rudimentärer Entwicklung der Müller'schen Gänge (Zeitsch. f. Geb. u. Gyn., 1884, Bd. 15, Heft 1, p. 138).

This operation was first of all practised by Amussat.

Should one decide to make an artificial vagina, one should proceed to separate the rectum with the greatest care, low down in the vulvar depression, using one's fingers principally as soon as the soft parts have been divided, and proceeding step by step, partly dissecting and partly tearing the tissues. The finger of the operator or of an assistant should be kept in the rectum, and a sound be placed in the bladder.

As soon as one has reached a sufficient depth, about 6 or 8 centimetres, one should proceed with the second stage of the operation, which is not the least important, and which consists in forming a covering of integument for the fundus of the infundibulum just created, for the purpose of resisting any contraction of the cicatrix.

For this purpose one should make use of the neighbouring mucous membrane and skin, which will have to be dissected and then made to slip into the required position; proper care should be taken of these tissues during the first incision, which should be transverse, with two small lateral incisions forming a figure like the letter H. After suturing, the artificial canal has to be stuffed with iodoform gauze, and this should be continued until the parts are perfectly healed. It can afterwards be replaced by one of Gariel's pessaries.

In spite of any amount of care bestowed upon this operation, of which Picqué* has published a very good example, one must only count upon the primary result being maintained with difficulty, for the diedral angle forming the bottom of the cavity can with difficulty be kept covered by the graft of mucous membrane, and the cicatricial tissue which is formed in it, even when the graft seems to adhere to it, tends invincibly to push the flap out and to gradually fill up the cavity. Fortunately, after leaving the surgeon's hands, the patient frequently helps on the work which has been done by daily indulging in the practice of coitus, so that in some cases results are obtained which could hardly be expected (Richet).

Polaiillon, in a case in which he could reach the uterus, did the operation in two sittings, at three weeks interval.† These

* L. Picqué. Congenital absence of the vagina; plastic operation, formation of an artificial vaginal canal (*Annal. de Gyn.*, Feb., 1890, t. 33, p. 124).

† Polaiillon. Complete absence of the vagina. Periodical dyamenorrhœa, formation of an artificial vagina (*loc. cit.*, p. 204).

uterus. This peculiarity is almost always found on the right side (twenty times out of twenty-eight, according to Puech). A pouch is thus formed, fixed against the side of the principal vagina, and remaining undiscovered there until it becomes filled with blood at the time of puberty, or with pus after becoming infected through some weak point in the septum. Some of those strange collections of matter thus take place which give one great difficulty in diagnosing, and which go by the name of hæmatocolpos or lateral pyocolpos.* The former, due to retention of the menses, often accompanies lateral hæmatometra; but the collection of pus in the pyocolpos may be limited to the vaginal pouch without distending the corresponding segment of the uterus, for it very rapidly succeeds in working its way out by perforating the vaginal septum (of which I have seen an example). Cases, however, have been seen of concomitant pyometria; they are very serious, and the perforation which may occur in the upper part of the septum in the uterus does not afford any relief, since the pouch becomes rapidly refilled after its evacuation (Breisky).

When hæmatometra is present as a complication, one may mistake the case for one of intra-peritoneal pelvic hæmatocele, owing to the resemblance of the signs. When the vaginal tumour alone exists, one may think there is a cyst of the vagina, and Freund† maintained that certain of these cysts had no other origin; there seems to be here undoubtedly some confusion between two perfectly distinct lesions.

The vagina may be partially divided by the septum; it is then the upper part of the septum which is wanting, for the coalescence of Müller's ducts takes place from above downwards.‡ When, however, the uterus is double, the vagina is sometimes found divided in its upper part, as if the uterine septum were prolonged into the vagina, while the inferior part had become fused.

Generally, the septum is thick, fleshy, with about the consistency of the recto-vaginal septum. But it may be thinner at

* The first cases were described by Holst. *Beiträge z. Gyn. u. Geb.*, Tübingen, 1865, Heft 1, p. 63.—Veit. *Krankh. der weibl. Geschlechtsorg.*, 2nd edit., Erlangen, 1867.—G. Simon. *Monatsch. f. Geb.*, 1864, t. 24, p. 292.—Breisky (*loc. cit.*) has collected 47 cases.

† Freund. *Zeitschr. f. Geb. u. Gyn.*, 1877, Bd. 1, p. 242.

‡ Hoppenheimer (*New York med. Woch.*, Feb., 1889, No. 2, p. 89) has reported a case of double vagina where one of the ducts was reduced to a mere cul-de-sac 1½ centimetres long, behind, and to the lower part of the hymen.

certain points, or even perforated. Lastly, it is sometimes reduced to mere vestiges, to fibrous bands stretching like bridges from right to left. These have, at various times, been mistaken for remains from the fusion of Müller's ducts, or adhesions formed during foetal life.

It is frequently possible for normal delivery to take place when there is a septum in the vagina. Dunning* has cited the case of a young woman who had two vaginæ separated by a septum, which commenced just above the vulva and was continued up to the interval between two small cervixes; by means of the sound one was able to ascertain that the septum was continued up into the uterus. Pregnancy occurred on the right side, where the uterine cavity was larger and deeper. The two cervixes both became equally tumefied, and the septum separating the two wombs disappeared, owing, probably, to re-absorption. During labour the vaginal septum was rent from above downwards, the inferior portion alone remaining intact. The patient was delivered without any difficulty.

Re-absorption of the septum dividing the vagina and uterus during pregnancy seems rather frequent. One might think that these abnormal tissues undergo some important perturbation in their nutrition, under the influence of the changes brought about by the puerperal state. Hence both the danger of rupturing the uterus and the likelihood of tearing the vaginal septum or any congenital bands which will not stretch. There have, however, been cases where an incomplete septum formed a spur which prevented the passage of the foetal head. They can be divided during labour without any fear of hæmorrhage.

For the symptoms and the treatment of hæmatometra accompanying lateral hæmatocolpos, I must refer the reader to the following chapter.

As for simple pyocolpos, without dilatation of the uterus, it requires to be very freely opened, or else the suppuration will not come to an end. I think that at the time of making the incision, one ought to remove the whole wall belonging to the pouch, or else it will form a double spur situated longitudinally in the single cavity now remaining to the vagina. This may be performed with scissors, and the cut surface may be touched with the actual cautery so as to stop the bleeding rapidly. This

* L.-H. Dunning. *Journ. of the Amer. Med. Assoc.*, 1st Dec., 1888, p. 762.

can also be done by introducing a continuous catgut suture. All that is required afterwards is to use some antiseptic injection and to introduce an iodoform tampon.

One should excise in the same way any septum or bands remaining from an incomplete septum which may form any hindrance to coitus.

IV. *Congenital atresia and stenosis. Transverse bands.*—The history of atresia of the vagina is mixed up, so far as its anatomy is concerned, with that of imperforations of the hymen, of absence and rudimentary development of the vagina, which have already been described.

Stenosis (or shortening) of congenital origin, when present in the shape of partial adhesions and transverse bands, is no doubt due to the partial persistence of the glueing together of the vaginal walls, which occurs at a certain period of foetal life, and which Geigel has observed in a foetus of 4 months. But it may also proceed from the still more marked arrested development of Müller's ducts in a certain point of their course. Thus one has seen some considerable shrinking, hardly admitting the passage of an ordinary probe, involving the upper third only of the vagina.* Any shrinking of this nature is situated fairly high up.

I shall simply mention the narrowing of the vagina occurring in cases of single-horned uterus. It is no doubt due to the organ having been formed from a single Müller's duct, the other having remained in an aborted condition throughout the whole length of the genital canal.

The transverse bands may, after undergoing the shrinking, appear in the shape of a crescent, or of an incomplete diaphragm. Such are, no doubt, the cases which have at times been described as supplementary hymen.† This shrinking causes the retention of the blood in the uterus when any tem-

* Kyri. Obstet. and Gyn. Soc. of Vienna, 15th May, 1888 (Centr. f. Gyn., 1889, No. 7, p. 116). In this case abortion took place first of all, and was followed by hæmatometra.—M. Rothenberg (Missbildungen des weiblichen Genitalschlauches. Inaug. Address, Koenigsberg, 1887) has observed stenosis situated above a double vagina.

† Fr.-L. Meissner. Die Frauenzimmerkrankheiten, 1843, t. 1, p. 353.—L. Kleinwächter (Die angeborenen partiellen Verengerungen der Vagina, in Prag. med. Woch., 1890, No. 48, p. 589) believes that this shortening is rarer than any other form; out of 21 cases of congenital stenosis, one of which was in his own practice, he only found a single one where the shrinking involved the upper part of the vagina.

porary obstruction occurs at its mouth; then a general clearing out takes place, followed by a fresh accumulation of the fluid. Serious complications may occur.

The obstacle in the way of coitus and parturition often necessitates some operative interference.* I ought, however, to observe here that, as in cases of vaginal septum during labour, the tissues become swollen, softened, and distended to an extent quite unexpected, which sometimes does away with the necessity of any intervention which might have seemed to be required.† This extensibility has, however, certain limits, and one ought not to hesitate about dividing with scissors any band offering any manifest resistance at the time of labour. Too much temporising has often been followed by rupture of the uterus.‡

One might compare the anomaly of transverse bands observed in the vagina in woman with the arrangement which exists normally in certain animals. In the cetaceæ§ as many as eight successive folds have been found, simulating a series of superposed *ores tinæ*. In the female chimpanzee|| the folds of the vagina form extensive crescents; in the sheep¶ the rings or diaphragms are found in the vagina as far up as the cervix uteri.

MALFORMATIONS OF THE UTERUS.

I. *Absence of the uterus. Rudimentary development of the uterus.*—These two malformations might as well be described together, since the points in which they differ, although interesting from a teratological point of view, are of no clinical importance. In both cases the organ is reduced to nothing, whether one finds no trace at all remaining, or merely some insignificant vestige.

* C. Heyder (Arch. f. Gyn., 1889, Bd. 86, p. 502) has performed an excision with the thermo-cautery for a congenital shrinking at the end of a pregnancy which continued normally.

† Säger. Obstet. and Gyn. Soc. of Leipsick, 21 Jan., 1889 (Centr. f. Gyn., 1889, No. 25, p. 440).

‡ E. Kennedy. Dublin Journ., 1840, t. 16, p. 88.

§ H. Beauregard and Boulard. Journ. de l'Anat. et de la physiol., 1882, t. 18, p. 187.

|| G. V. Hoffmann. Zeitschr. f. Geb. u. Gyn., 1878, Bd. 2, p. 4.

¶ P. Müller. Ibid., Bd. 3, p. 104.

Complete absence (*defectus uteri*) is extremely rare, and several of the cases which have been reported owe their existence to an erroneous interpretation of facts. In several autopsies what seems to have been mistaken for the tubes was in reality nothing but rudimentary uterine horns. The exact insertion of the round ligaments forms a valuable landmark for

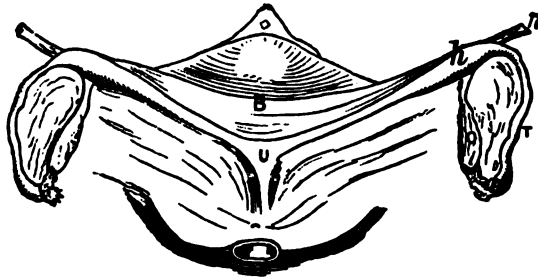


Fig. 491.—Rudimentary uterus (J. Veit).

U, uterus with no cavity; h, rudimentary horn; O, ovary; T, tube; r, round ligament.

determining the real condition. In complete absence of the uterus, the rectum and the bladder are in contact, and the round ligaments become lost in the connective tissue situated between the two cavities. The ovaries may also be wanting.

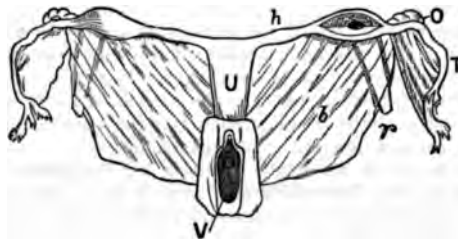


Fig. 492.—Rudimentary uterus of the bipartite variety (Rokitansky).

V, closed vagina; U, cervix uteri; H, rudimentary horn; T, Fallopian tube; r, round ligament; O, ovary; b, broad ligament.

Such an anomaly is mostly found with other serious malformations connected with the viscera in non-viable foetuses.

The rudimentary uterus (*uterus rudimentarius*) consists of a small mass of variable shape, occupying the place where one ought to find the uterus. In extreme cases, which have often been mistaken for cases of complete absence, there is nothing but a slight thickening of the posterior wall of the bladder

(Veit), or else a few bands of fibro-muscular tissue are added to the broad ligament (Langenbeck), or maybe one finds a sort of narrow band stretching between the two tubes (Nega). When this latter is added to a cervix in such a way as to form a sort of T, the name of uterus bipartitus has been given to the organ thus reduced to two horns, reproducing the type found in certain species of animals. These horns are sometimes hollow, and lined with mucous membrane. The ovaries may be wanting, or if they exist, they may be atrophied, flattened, or tapering; but they may also be normally developed (figs. 491 and 492).

Ovulation may take place in such a case, but as a general rule no molimen is seen, nor is there any menstruation. Besides, most often the vagina is totally absent, or at least the Müllerian portion is wanting, and the lower portion is only represented by a short vestibular canal. The external genitals are regularly shaped.

In certain cases the vagina is completely developed. I have seen it in two cases.* Mundé† reported a case in his own practice. Leopold seems also to have had a case of the same kind. One case, in which castration was performed afterwards

* The first case was that of a young girl of a scrofulous appearance, but who, however, was perfectly well developed, presenting a normal vagina, terminating in a cul-de-sac. There was no trace of the uterus or of the ovaries to be detected by bimanual palpation, nor was there any menstrual flow. She experienced no pain, and consulted me merely on account of the amenorrhœa. In the second case there were also normal external genital organs, but the amenorrhœa was accompanied by intense pains. I removed the ovaries, which I found quite normal, and also an uterus as large as a sewing thimble. Perfect cure followed.

† Mundé. Zur Kasuistik des totalen Mangels der Gebärmutter bei normaler Vagina und einer seltener Zwitterbildung (Centr. f. Gyn., 1887, No. 42, p. 670). This work might mislead one if it were not very carefully criticised. In fact, out of the four cases which Mundé compares to his own, three, no doubt, are essentially different, and are examples of male pseudo-hermaphrodites, or of individuals with hypospadias with vestibular pseudo-vagina (cases of Ricco, Steglehner, Giraud, Chambers).—The only case of Leopold's (mentioned by Mundé, *loc. cit.*, 671) seems to be that of a woman with no uterus, but with a complete vagina. The ovaries (which Leopold thought to have been testicles) were situated at the entrance of the vaginal canal. In the individual observed by Mundé, there was also a double inguinal hernia, and after its reduction there were to be observed in the labia majora two ovoid bodies which Gaillard Thomas called ovaries, and which Mundé, without sufficient proofs, described as testicles, so that his patient would have been an hermaphrodite. Nothing however in the conformation of the external genital organs would lead one to believe that it was a case of perineo-scrotal hypospadias as it would have been if the individual were a male, and the bodies contained in the labia majora were testicles, and not herniated ovaries.

for pains caused by ovulation, was reported by Max Strauch.* One is sometimes, in fact, compelled to have recourse to removing the ovaries when they have been normally developed, in spite of the atrophy of the uterus, if ovulation produces the periodical return of pain and disorders of a nervous kind. It is an indication for Battey's operation (see p. 290, vol. 2).

There is nothing externally in women to make one suspect these anomalies. The appearance of the body, the voice, the psychical characters, are all those of a well-developed woman; the breasts are quite normal. They most often have connection with men, and this ends by depressing the vulva or the vestibular canal into a fairly deep cul-de-sac; at other times it is the urethra which becomes dilated, and is made use of during copulation.

It is easy enough to diagnose between a normal uterus and an atrophied organ if one explores bimanually through the rectum, or by combining the rectal tactus with the use of the sound in the bladder, or even with the vesical tactus one may get useful information. At the same time one ought to get an assistant to depress the abdominal walls above the pubis. As to ascertaining on the living subject whether there is total absence of the uterus, or a rudimentary uterus, it is generally quite impossible.

Breisky has placed in one special class those cases of absence and atrophy of the cervix uteri which often coincide with absence of the upper part of the vagina. The uterus is atrophied, membraniform, but differs from the rudimentary uterus owing to the presence of a true uterine cavity, in which the menstrual flow sometimes takes place, constituting hæmatometra. The cervix is entirely absent, or is represented simply by some ill-defined thickening. If no effusion of blood takes place into the uterus, the symptoms in no way differ from those of a rudimentary uterus. In the opposite case, the symptoms are those of hæmatometra.

II. *Single-horned uterus*.—The uterus is developed out of a single Müller's duct, the other one being atrophied. The

* Max Strauch. Zur Castration wegen functionirenden Ovarien bei rudimentärer Entwicklung der Müller'schen Gänge (Zeitschr. f. Geb. u. Gyn., 1888, Bd 15, Heft 1, p. 188). A similar case was published by O. Bloch, Nord. med. Ark., 1891, No. 2.

organ from the neck upwards becomes elongated, tapering and curved towards the tube, with which it is directly con-

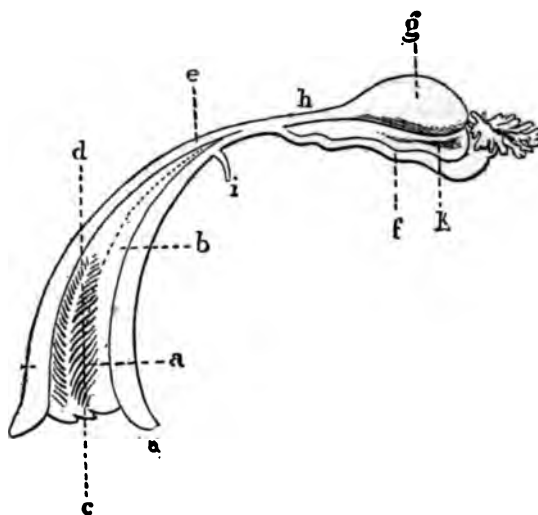


Fig. 493.—Diagrammatic representation of a left single-horned uterus in an infant (P. Müller).

a, cervical portion; *b*, body; *c*, *d*, longitudinal axis of the foetus; *e*, summit of the uterine cavity; *c*, *e*, longitudinal axis of the body of the uterus; *f*, tube; *g*, ovary; *h*, ligament of the ovary; *i*, round ligament; *k*, parovarium.



Fig. 494.—Single-horned uterus (Schröder).

R, right side; *L*, left side; the left horn (*h*) is normally developed and communicates with the uterine cavity. The right horn is seen as an elongated band; its point of junction with the tube is indicated by the insertion of the round ligament, which is hypertrophied; *r*, round ligament; *O*, ovary; *t*, tube; *v*, vagina.

tinuous, so that it merely constitutes its inferior and expanded portion. The ovary is found situated at the summit of the horn.

Only half the body of the uterus exists in reality, so that its cavity is very small compared with that of the cervix. The vagina is very narrow (fig. 493).

On the opposite side there may be no single vestige of Müller's duct, in which case the uterus is absolutely single-horned.

One important variety is constituted by the presence of a rudimentary horn. This may be formed by a compact band of muscular tissue, or contain a small cavity which communicates with the larger horn, and forms a sort of diverticulum out of it. The rudimentary horn is inserted on a level with the internal

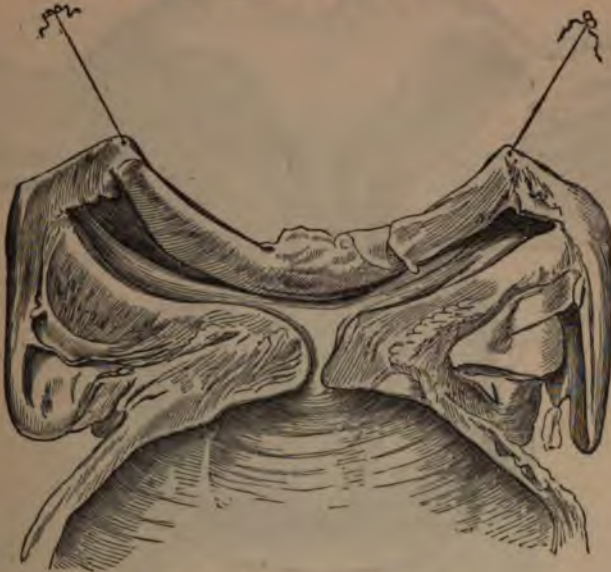


Fig. 495.—Double bicornate uterus (Barnes).

orifice of the cervix, for in these cases the body of the uterus does not exist. It is directed upwards and outwards. It is very long, appearing to have been stretched out, like the ovary on the corresponding side, and it is subject to variations in form.

The single-horned uterus consists originally of a mutilated organ, but in the adult it has the functions of a normal uterus; menstruation is regular; pregnancy takes place without any disturbance in the greater horn. It is quite otherwise if the ovum becomes deposited in the rudimentary horn. In that case the walls of the horn, being incapable of supplying enough

substance to line the cavity required by the ovum during its development, become ruptured between the third and sixth months. This form of pregnancy is quite rightly classed with extra-uterine pregnancies, having the greatest analogy to them, and is described in the chapter dealing with them.

It is rare for it to be diagnosed. The malformation may, however, be suspected, when with a narrow vagina, a thick and short cervix, one can make out by bimanual palpation an uterus which is elongated and curved as a crescent.

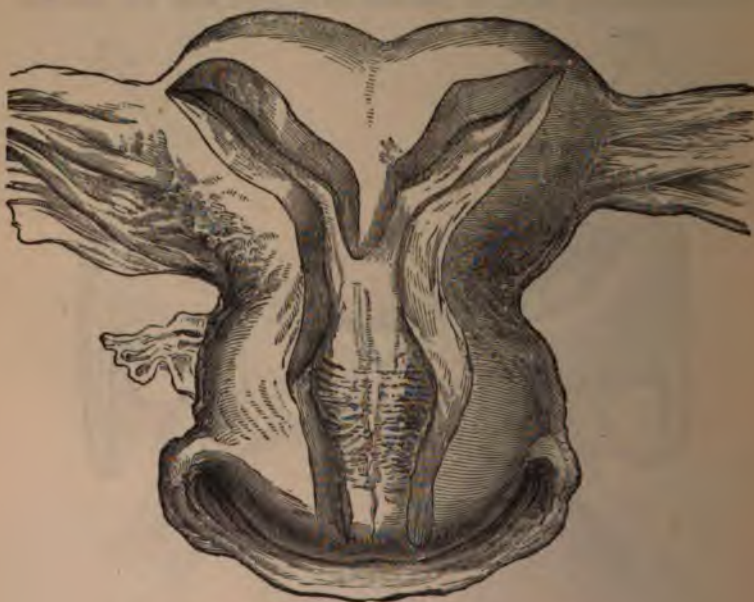


Fig. 496.—Unicervical double-horned uterus (Barnes).

Pregnancy in a rudimentary horn is almost always mistaken for a tubal pregnancy, on account of the pedicle which separates the tumour from the greater horn; this latter then simulates the body of a well-formed uterus.

III. *Double uterus*.—The uterus is really double when Müller's ducts have not become fused together, or are only united partially, each one being completely developed independently of the other.

There are several varieties of double uterus.

1st. The bicornate uterus (*uterus bicornis*), in which the axis of the two halves of the uterus go off into different directions. If this doubling of the parts extends as far as the cervix, which is also divided by a septum, one has to deal with a properly so-called double bicornate uterus (*uterus bicornis duplex*, or *septus*). When there is a greater degree of coalescence the cervix presents no trace of any division, but remains very large. This is the unicervical bicornate uterus (*uterus bicornis unicollis*). Lastly, the union of the two segments of the uterus may be almost complete, and their bifid state may only be manifested



Fig. 497.—Uterus arcuatus with two horns (Barnes).

by a depression of the fundus of the organ, which is very much spread out. This is the arched bicornate uterus (*uterus arcuatus*), a transitional form, and a last step towards the normal condition (figs. 495, 496, and 497).

As a rule, the left horn is directed forwards, so that the uterus undergoes a certain amount of rotation on its vertical axis. One very frequently finds a frenum running from the posterior surface of the bladder to the anterior surface of the rectum, passing over the depression which separates the two

uterine horns. It is either the origin or the result of the malformation. It becomes of great importance in cases of pregnancy on account of the dystocia.

The two halves of the uterus are rarely equal, and one may observe all the transitions between the single-horned uterus and the uterus with a single rudimentary horn. The side which is least developed may be in a state of atresia, and give rise to hæmatometra.

The external genital organs and the breasts are normal in



Fig. 498.—Bilocular uterus and divided vagina; vertical section (Kussmaul).

U, septum dividing the uterine cavity into two lateral parts; *T*, tubes; *V*, vagina divided into two by the prolongation of the uterine septum.

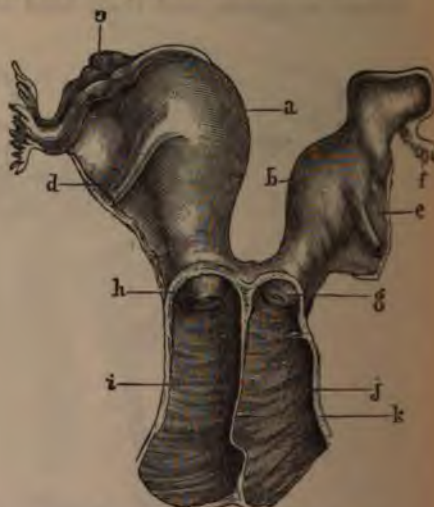


Fig. 499.—Didelphous uterus and divided vagina (Ollivier).

a, right segment; *b*, left segment; *c*, *d*, right ovary and round ligament; *e*, *f*, left ovary and round ligament; *g*, *h*, left cervix and vagina; *i*, *j*, right cervix and vagina; *k*, septum dividing the two vaginæ; *h*, *i*, right cervix and vagina.

their development. But the vagina is often double, and one half of it may form a cul-de-sac, and be affected with lateral hæmatocolpos.

In the double-horned uterus, when the two segments are equally developed, menstruation may take place from both sides. Pregnancy has sometimes occurred without interfering with the menstruation taking place on one side.*

* F. Henderson. Glasgow Med. Jour., April, 1883, t. 19, p. 268.

Pregnancy* may follow a regular course, and the foetus may go on to its full time. The empty half of the uterus becomes hypertrophied at the same time as the gravid half, and a deciduous mass has sometimes been expelled. During labour the two horns undergo contractions.

Gontermann† has reported a case where pregnancy appeared to take place in each horn alternately. Twin pregnancies have been observed, with a foetus in each horn, or with both in one single horn. In cases of uterus arcuatus transverse positions are of frequent occurrence. This malformation of the uterus is, like all the others, a cause for faulty insertion of the placenta. Rupture of the uterus has been observed.

The vesico-rectal band which I have pointed out may be an obstacle to the passage of the foetal head. Sometimes it is sufficient to correct the obliquity of the gravid horn, or to lay the patient on the opposite side; in the opposite case one should resort to podalic version and extraction. Any bands placed across the cavity of the vagina should be divided if necessary. Any collection of blood in the vagina which may be a cause of dystocia should be evacuated.

I ought to mention, before leaving the subject, how frequently one sees some uterine abnormality pass unobserved during pregnancy and labour, and only be discovered subsequently.‡ The intermediate partition is mistaken on digital examination for the vaginal or uterine wall.

2nd. Bilocular uterus (*uterus bilocularis*; *uterus septus bipartitus*). The characteristic feature of this malformation consists in the perfectly normal external configuration of the uterus, occurring with a cavity separated into two parts by a median septum. This division may be complete, or may terminate more or less low down, forming the uterus subseptus, or it may

* For the diagnosis of abnormalities of the uterus during pregnancy, see L. G. Litschkus. Beitrag zur Frage über die Anomalien des Uterus (Zeitschr. f. Geb. u. Gyn., 1888, Bd. 14, Heft 2, p. 369).—G.-E. Curatulo. Gravidanza in utero doppio (Riforma med., 1891, No. 104).

† E. Gontermann. Geschichte eines Uterus bicornis (Berlin klin. Woch., 1870, No. 41, p. 616).

‡ Riedinger. Wien. klin. Woch., 1889, No. 45, p. 859.—Dunning (*Uterus bilocularis* in Journ. Amer. Med. Assoc., Aug. 23rd, 1890, p. 282) only recognised the existence of a double uterus during a second pregnancy.—T. A. Reamy (Transact. Obstet. Soc., Cincinnati, 12th Feb., 1891) has reported the case of a woman in whom a double uterus was only recognised during the fourth pregnancy.

even have a number of perforations leaving nothing but so many bands across the cavity. The vagina may be single, or divided by a septum. In the latter case, each vaginal cavity corresponds to a segment of the cervix (fig. 498). Corazza* has reported an exceptional case, where there was a double vagina and the uterus had no septum.

3rd. Didelphous uterus (*uterus duplex, separatus, diductus*). One has here, in reality, to deal with two uteri, separated as far as the fundus inclusively, and not merely with two more or less diverging uterine bodies, as in the case of a double-horned uterus, for instance. Here each segment presents the appearance of a complete uterus. One might, with reason, look upon them as two single-horned uteri equally developed, and placed side by side without becoming fused together. For a long time it was supposed that this malformation only took place in a foetus which was not viable, and accompanied other serious monstrosities. It is to be met with, in fact, under such conditions, along with extroversion of the bladder, atresia of the anus, and persistence of the cloaca. The cases observed in adults are all of relatively recent date; but one ought probably to class amongst cases of didelphous uterus several which date very far back, and which were looked upon as examples of double-horned uterus.† The most typical example of a didelphous uterus in an adult woman is that of Ollivier's‡ (fig. 499), found at the post-mortem examination of a woman aged 42 years, the mother of 6 children. Heitzmann§ described a case in a young woman of 23 years. The vagina was divided by a septum which separated the cervix; when one passed a sound simultaneously into each of the two cavities, one found that they were united on the level of the cervix, and then became

* Corazza. Schmidt's Jahrb., 1870, Bd. 148, p. 148.

† There is still some dispute going on as to the exact classification; for instance Heppner's case (Schmidt's Jahrb., 1871, t. 8, p. 161), considered by Schröder (*loc. cit.*, p. 39, in footnote) as a case of didelphous uterus, is formally rejected by Breisky (*loc. cit.*, p. 268) as a case of rudimentary uterus bipartitus.

‡ A. Ollivier (Report of the Soc. de Biologie, in *Gaz. méd. de Paris*, 1872, p. 168). He compares his case to the other, which is that of a woman aged 25 years, reported by Bonnet, mentioned by Le Fort (*loc. cit.*, p. 25).—Franz Freudenberg (*Zeitschr. f. Geb. u. Gyn.*, 1880, Bd. 5, p. 334) has published a case of didelphous uterus in which the right uterus was closed.—Fritz Benicke (*ibid.*, 1877, Bd. 1, p. 866) was present at a labour in which the foetus was placed in the left segment of a didelphous uterus.

§ J. Heitzmann. *Spiegelbilder der gesunden und kranken Vaginalportion und Vagina*, Vienna, 1884, p. 71.

widely divergent above, forming two distinct and movable organs.

There has been no case of didelphous uterus reported in which was found the vesico-rectal ligament, which is so frequently placed above the division of the two-horned uterus.

It is always very difficult at a clinical examination to decide whether one is dealing with a complete double-horned uterus or with a didelphous uterus. This can hardly be determined with any certainty except at a post-mortem examination. The clinical history also of these two malformations appears to be mixed up, as far as one can judge, by the few examples of the latter one which we possess.

Atresia of one of the segments of a didelphous uterus may give rise to lateral hæmatometra.* Pregnancy may occur in the two cavities simultaneously.†

IV. *Fœtal or infantile uterus.*—This abnormality takes place when the uterus, being completely developed as regards its general shape, remains stationary, while still preserving the proportions and almost the dimensions which it had at birth. A somewhat subtle difference has been established between the fœtal uterus, which represents the last stage of evolution in fœtal life, and in which the folds of the mucous membrane extend into the body of the uterus, and the infantile uterus, in which one finds the type belonging to a newly-born child, and where the palm-like folds are only found in the cervix. There is here a mere shade of difference in the morbid anatomy which deserves only to be mentioned; in all other respects the two varieties are to be mistaken for each other. One of their characteristics is the disproportion between the cervix and the body of the uterus, reproducing the fœtal type. The cervix is two or three times longer than the body, and whilst its walls are relatively thick, those of the body are thin and sometimes membranous. The total length of the uterine cavity does not exceed 4 centimetres; the os tincæ



Fig. 500.—Infantile uterus (Schröder).

* Staude, mentioned by P. Müller. *Die Sterilität der Ehe*, 1885, p. 272.

† Sotshawa. *Moskowl. med. Gaz.*, 1878, No. 25 (*Anal. in Centr. f. Gyn.*, 1879, No. 6, p. 152).—H. St. Clair Gray. *Glasgow Med. Journ.*, March, 1889, t. 31, p. 182.—Althen (of Wiesbaden) *Schwangerschaft in beiden uteri bei Duplicität der Genitalien* (*Centr. f. Gyn.*, 1890, No. 40, p. 711).

is small, with a narrow orifice, either conical in form, or slightly tapiroid (as a tapir's snout). The vagina is generally short and narrow; the external genital organs are sometimes slightly developed; the breasts are small; there is complete absence of menstruation.

The existence of an atrophied uterus may be easily detected by bimanual palpation, aided by the rectal tactus. To distinguish an uterus of the foetal type from a pubescent uterus,* which one might call the uterus of the period preceding puberty, presenting the same reduced dimensions, and producing the same amenorrhœa, one ought, theoretically, to be guided by the volume of the cervix. In the foetal uterus this segment is fairly firm, especially in its supra-vaginal portion. In the pubescent uterus, on the contrary, the whole organ, including the cervix, is thin and relaxed. As a matter of fact, for clinical purposes, these shades of difference, which have no practical value, are almost illusive.

SMALL ABNORMALITIES OF THE UTERUS.

Under this heading one ought to describe certain slight malformations which cannot very well be classified with those which have already been given.

Congenital obliquity and latero-position of the uterus.—These are due to true asymmetry of the uterus, one half of which is predominating, and so causing the organ to be distorted and to be bent over towards the side which is most developed, the relative shortness of the broad ligament is one of its results. In slightly marked cases there is merely some latero-version, which might be compared to congenital anteversion. When well marked one might mistake the case for one of single-horned uterus, if one were not warned beforehand against such a cause of error.

Cervix with double external orifice (uterus biforis).—There may be a double orifice to the os tinæ in spite of the absence of any septum in the genital canal.† This anomaly has been the cause

* The pubescent uterus has been described under the title "Congenital atrophy of the cervix and of the uterus" (Book 7, p. 2).—Congenital hypertrophy of the uterus is described in connection with "Precocious menstruation" (Book 8, p. 269, vol. 2).

† This is the normal condition in the ant-eater.

of complications during delivery. Most often this frenum has been pushed to one side or else torn; sometimes, however, one has seen some rather severe hæmorrhage result from it. One can readily imagine the perplexity of the accoucheur if he does not bear this anomaly in mind. Should he recognise it, he ought to try and keep the frenum on one side and to free the fetal portion, or, if he does not succeed in doing this, he should divide it between two ligatures.*

Cervix divided by an incomplete septum.—P. Müller† was the first to describe a curious malformation of the cervix uteri, consisting in the presence of a transverse fold forming a prominence in the cavity. It may, when the external orifice has been dilated, suggest the idea of a second cervix fitting into the



Fig. 501.—Congenital obliquity of the uterus. Incomplete development of the right side (Tiedemann).

first. Breisky also observed this abnormality, but his case was never published. In two cases which have been described as being seen independently of pregnancy, the band of division had given rise to hæmorrhage; it seemed to have acted like a fibroid or polypus. The excision of the band caused all the symptoms to cease.

It may also be a source of obstruction in the way of delivery. Bidder‡ has published a very instructive case bearing on this point. Later on, Budin§ also drew attention to this subject,

* Mekus. *Centr. f. Gyn.*, 1880, No. 13, p. 294.

† P. Müller. *Zeitschr. f. Geb. u. Gyn.*, 1878, Bd. 3, p. 159.

‡ E. Bidder. Mentioned by P. Müller, *loc. cit.*, p. 296.

§ On the incomplete transverse septum of the cervix uteri (*Progrès méd.*, April, 1887, pp. 267 and 307).

when reporting two of his own private cases, in which the septum in the cervix had produced no dystocia, and two cases in Madame Henry's practice, in one of which the septum seemed to be placed at the internal orifice, and in the other two centimetres higher up, in the inferior segment of the uterine cavity. Two analogous cases have since been described by E. Blanc.* When delivery has taken place one may either find the septum disappear or continue as before.

This abnormality has been compared to the transverse folds of the genital canal which exist in the normal state in certain animals, and which I mentioned in reference to the bands across the vagina (p. 485).

* Emile Blanc. On the incomplete transverse septum of the cervix uteri (*Arch. de tocol.*, May 1889, p. 359).

CHAPTER III.

ATRESIA OF THE GENITAL ORGANS COMPLICATED BY RETENTION.

(HÆMATOMETRA. HÆMATOCOLPOS. PYOMETRA. PYOCOLPOS.
HÆMATO-SALPINX.)

Ætiology and symptoms. Hæmatocolpos. Hæmatometra. Pyocolpos. Pyometra.—
Diagnosis. Lateral hæmatocolpos and lateral hæmatometra.—*Prognosis.*—*Treatment.* 1st. Total hæmatocolpos and partial hæmatometra. (Atresia of the hymen or retro-hymen.) 2nd. Partial hæmatocolpos and partial or total hæmatometra. (Atresia of a large part or of the whole of the vagina.) 3rd. Total hæmatometra. (Atresia of the cervix uteri.) 4th. Lateral hæmatocolpos and lateral hæmatometra. (Atresia of a portion of the double genital canal.) Indications for hysterectomy. 5th. Hæmato-salpinx. Indications for salpingotomy.

Ætiology and symptoms.—I have pointed out under what conditions the genital canal may be found closed, owing to atresia, in certain parts of its course, from the hymen as far as the retracted portion of a rudimentary horn. This occlusion, as one has seen, may completely close the canal, entirely close one of the halves derived from its double origin, or simply cut off a diverticulum due to the faulty conformation of the parts. Should the state of the ovaries and of the mucous membrane of the tubes and uterus be such that menstruation takes place when puberty is reached, the blood flowing both into the tubes and into the uterus is unable to find any outlet. So that it accumulates in the closed space into which it flows, and distends its various portions.

Hæmatocolpos is observed when the hymen, or lower portion of the hymen, is imperforate, appearing as a tumour compressing the rectum and bladder, and causing a protrusion of the membrane, limiting it on the side of the vulva. The uterus is pushed upwards, and forms a sort of hard knob on the top of the tumour. At first merely the cavity of the cervix is distended, as the body goes on resisting for a longer while.

Fluctuation can be detected bimanually, one finger being introduced into the rectum. The small hard tumour situated on the summit of the pouch, and which consists of the non-dilated uterus, often puzzles one a good deal when forming one's diagnosis (fig. 503).

When the inferior portion of the vagina is absent, the hæmatocolpos is confined to that portion of the canal which exists, and to the neck of the uterus. But here, again, the body of the uterus is not dilated at the beginning, and if it eventually becomes so, it is only very late. When an opening is made into the collection of blood, one cannot with one's finger detect



Fig. 503.—Hæmatocolpos due to atresia of the hymen (Schröder).

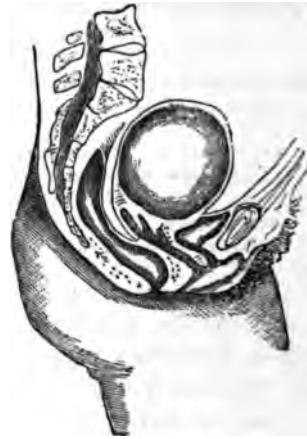


Fig. 504.—Hæmatometra due to obliteration of the internal orifice of the cervix.

any line of demarcation between the vagina and the distended cervix.

Hæmatometra will be certain to occur if the cavity of the uterus happens to be the only place in which the blood can accumulate. This is what happens when the vagina is totally absent, or when there is atresia of the orifice of the cervix.* In this case the whole womb is transformed into one pouch, with walls which are usually thick, and no difference to be detected between the body and the neck. If the atresia is

* Hæmatometra has, however, been exceptionally observed in cases of simple imperforation of the hymen.—Gelbke. Gyn. Soc. of Dresden, 6th April, 1891 (Centr. f. Gyn., 1892, p. 106).

situated on a level with the internal orifice, the body only is distended, and the neck preserves its usual dimensions (fig. 504). In all cases of hæmatometra, and in many of those of hæmatocolpos, the tubes become dilated, forming a hæmato-salpinx. The blood does not accumulate in them owing to the uterus being over-distended, and this is proved by its not being possible for any communication to exist between the collection in the uterus and the collection in the tube,* since the latter may be present when the former is absent. One is bound to admit that the blood in hæmato-salpinx has been poured out owing to an exudation from the mucous membrane of the tubes coinciding with that from the uterus during menstruation. The thinness of the walls of the oviducts allows them to become distended when pressure increases in the interior of the genital canal owing to the closure of the inferior part of the vagina, whereas the thick muscular coat of the uterus resists much longer.

These irregular and contorted tumours of the tubes may attain an enormous volume. Sometimes a small quantity of blood manages to filter through the closed abdominal orifice, and then one finds some small patches of peri-metro-salpingitis (pelvic peritonitis). Should the blood flow into the abdomen in great abundance, it cannot be reabsorbed, and constitutes a pelvic hæmatocele, which may be accompanied by general peritonitis.

The contents of these various pouches, formed by the retention of the menses, consists of blood which has become concentrated, as one might say, of a chocolate colour, thick in consistence, and sirupy, like pitch; the red cells are very much deformed. When a puncture has been made to induce its evacuation, the pouch may be seen to suppurate, and be transformed into a pyocolpos or a pyometra;† the decomposition of

* Gosselin. *Gaz. des Hôp.*, 1867, No. 57, p. 225.—Many analogous cases have since been published.

† Quite exceptionally one has seen an accumulation of mucous forming the vaginal tumour.—Godefroy (*Gaz. des Hôp.*, 1856, No. 42, p. 567) has found it behind an imperforate hymen, in a small girl two months old, in whom there was compression of the rectum and the urethra.—Breisky (*loc. cit.*) observed two analogous cases, in newly born infants, and became convinced that the thin obstructing membrane did not belong to the hymen but to the retro-hymen.—A. Bryck (*Wien. med. Woch.*, 1865, No. 11, p. 169) found some mucus, instead of blood, in a young girl of 18 years.—In a young woman aged 23 years, the same fact was

the liquid parts may be the cause of the production of a collection of gas, or pyometra.

Besides the apparition of the tumour at puberty and its

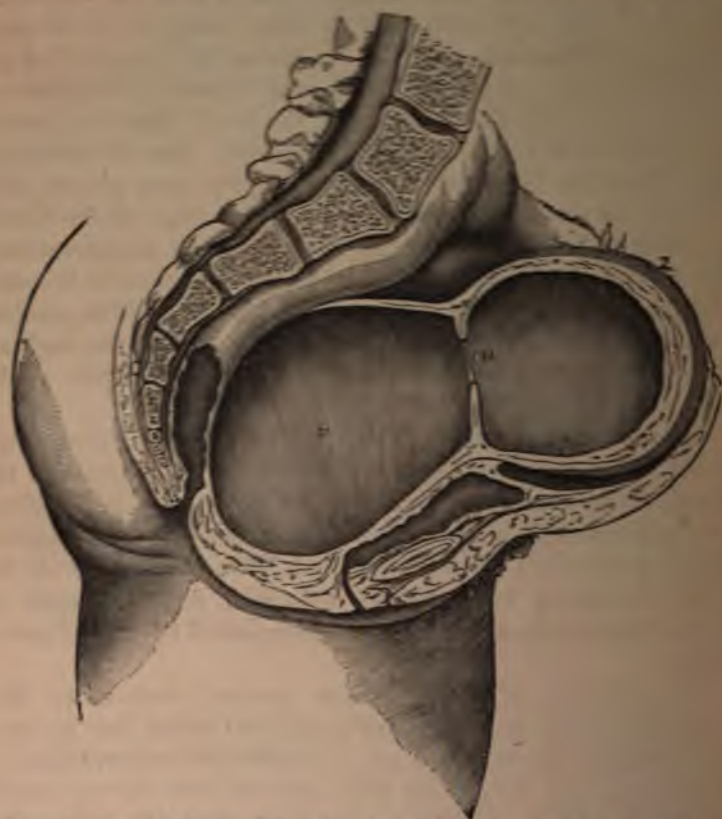


Fig. 505.—Haematocolpos and haematometra produced by atresia of the inferior portion of the vagina.

v, distended vagina; *ou*, internal orifice of the cervix (Barnes).

gradual increase in size, there are pains at the menstrual period coming on as colic, and which one may consider due as much

observed by Veit (case published by Stroetter. Inaug. Address, p. 26).—Collections of blood may become infected in a manner which is sometimes difficult to explain, and they suppurate, as is proved by a case of Rheinstaedter's. *Primärer Pyocolpos und Pyometra bei einem 13 jährigen Kinde* (Centr. f. Gyn., 1890, No. 9, p. 142). This author observed a curious case of primary pyometra and pyocolpos, from imperforation of the hymen, without any previous collection of blood, in a young girl before puberty.

to the distension as to the escape of a small quantity of blood into the peritoneum. These pains gradually become more frequent, then constant, and affect the patient's health.

In certain cases, corresponding no doubt with those in which the menstrual flow is very slight, owing to a peculiar condition of the ovaries, or of the mucous membrane of the uterus, the accumulation of blood is very moderate, and the principal symptom is the pain.*

It may even happen that a true compensatory deviation of the menses, in the shape of some supplementary hæmorrhage, may prevent the formation of a hæmatometra.† Lastly, in many cases, the obliteration of the genital canal coincides with amenorrhœa, which is quite as real as it is apparent. Certain patients only suffer pain each month at the time of ovulation, which remains, so to say, unresponded; there are even some who feel no pain, and in whom there is no doubt that the ovary does not fulfil its functions.

Diagnosis.—Absence of menstruation, imperforation which can most often be detected on examination, and the apparition of a tumour occupying the place where the genital cavities ought to be found, such are the signs which, when present together, are pathognomonic.

Atresia of the hymen, or of the retro-hymen, has often been confounded, as I have already said (p. 449), although this is of no real importance. In either case the limiting membrane can be depressed, although it is thick enough for spontaneous rupture to be very rare. The vulva is prominent, the perinæum is bulging, and the condition has been compared to the bag of waters occurring in labour.

One ought to be most careful in examining tumours of the uterus and tubes, and not to persist in trying to find any fluctuation, for fear of causing a rupture. Besides, that sign may be absent; when the pouch is much distended, it is merely elastic.

Much doubt may be raised when one is dealing with a hæmatometra due to obliteration of the internal orifice, with an intact cervix. One will have to diagnose it from a pregnancy, a fibroma, and a cancer of the fundus, by means of the signs by which each one is distinguished.

* Polakillon, *loc. cit.*

† Le Fort, *loc. cit.*

When the genital canal is totally or partially double one may find serious difficulty in distinguishing between lateral hæmatocolpos and lateral hæmatometra (fig. 506). The tumour formed by the lateral hæmatocolpos does not always lie exactly alongside the vagina with an open end, but, owing to an evolution which Breisky has clearly pointed out, it has a semi-spiral course round this canal, so that its inferior portion may be anterior and its superior portion be posterior, or *vice versa*. The upper part of this fluctuating and cylindrical tumour is surmounted by the corresponding uterine horn. Great carelessness would be

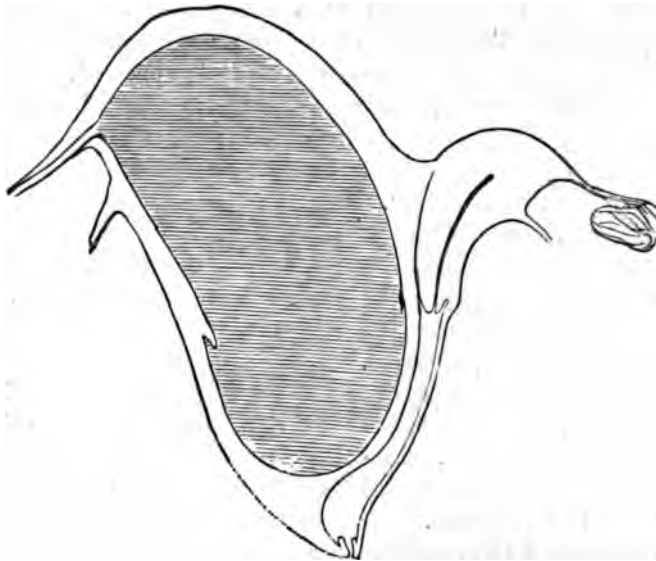


Fig. 506.—Diagram representing lateral hæmatocolpos and lateral hæmatometra due to a complete septum in the genital canal, with atresia of one of the vaginal canals (A. Martin).

required to mistake it for a cystocele, a vaginal cyst, a vaginal enterocele, a thrombus, or a retro-uterine hæmatocele. The diagnosis is much more difficult when the vaginal canal is double, and when, in consequence, the menstrual flow has accumulated in one segment of the bicornate, bilocular, or didelphous uterus. One ought to try and carefully make out the exact relations of the tumour by bimanual palpation, and to discover the non-dilated segment of the uterus which has been pushed on one side. It is especially when there is hæmatometra

of a rudimentary horn that one invariably has difficulty in forming a diagnosis, and that one mistakes the tumour for a cyst of the tube, all the more so when the corresponding tube is also dilated. One should also be careful not to take it for a fibroid. Pregnancy may take place in the free portion of the uterus and add considerably to the complication of the physical signs. I look upon an exploratory puncture as extremely dangerous, and I much prefer making an exploratory incision, should it be required in doubtful cases.*

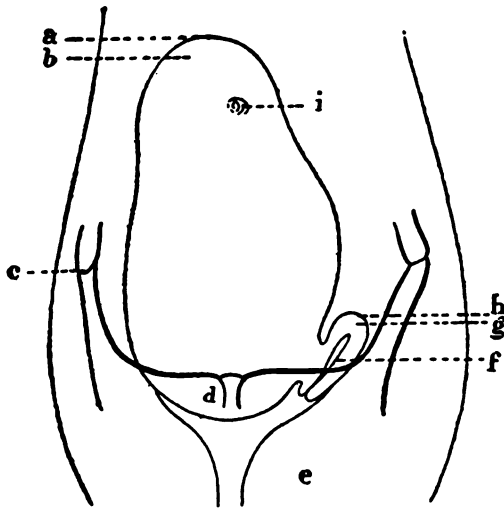


Fig. 507.—Lateral hæmatometra in a segment of a double uterus affected with atresia (diagram by Staude).

a, b, insertions of the right tube and round ligament; *c*, ilium; *d*, symphysis pubis; *f, j*, uterus; *g, h*, insertions of the left tube and round ligament; *i*, umbilicus.

Prognosis.—When these collections of blood resulting from atresia of the genital organs are left to themselves, the prognosis is very serious.† Spontaneous evacuation does not cure them,

* Saolowjew (Obstet. and Gyn. Soc. of St. Petersburg, 23rd Feb., 1888, in Centr. f. Gyn., 1888, No. 50, p. 886) has reported a case of an exploratory incision, done by Professor Slavjansky, in a case of atresia of the genital organs (superior hæmatocolpos and cervical hæmatometra) in order to ascertain exactly the position of the parts, after which the abdomen was closed, and the collection of fluid was opened through the vagina.—Slavjansky approves of this proceeding, as a preliminary operation, whenever there is any difficulty in making out the relationship of the parts.

† A. Desprès (Retention of the menses; umbilical tumour, in Bull. et Mém. de la Soc. de chir., 1886, p. 89) has published a curious case of hæmatometra in a young girl of 14 years, without hæmatocolpos, and due, no doubt, to atresia of the cervix;

but causes a temporary relief, followed sooner or later by the recurrence of the symptoms of retention, frequently aggravated by suppuration. In fact, any perforation which has taken place spontaneously is always insufficient and becomes closed after the evacuation has occurred, but also after the sac has become infected. When the tumour has emptied itself into the neighbouring organs, into the intestine, or even into the stomach, which has rarely been seen, the result has been just as bad; at the next menstrual periods the pouch will be constantly refilled, and the patient becomes exhausted. Death may occur from septicæmia, after spontaneous opening, or from peritonitis after rupture into the peritoneum.

In atresia of one segment of a double genital canal the prognosis is less serious. Lateral hæmatocolpos frequently ends by rupturing inwardly towards the vagina which is open, or on the level of the intra-cervical septum. But suppuration generally occurs in this cavity, and gives rise to a pyocolpos which alternately empties and refills, and may give rise to serious trouble if measures are not taken to transform the natural perforation into a large opening. In partial hæmatometra situated in the rudimentary horn, the effusion of blood may cease and the tumour remain stationary.

Before the days of antiseptics, the laying open of these large accumulations very frequently gave rise to septicæmia, whether it was done freely by means of an incision, without sufficiently emptying the sac afterwards, or whether one did it by means of a puncture, to avoid the entry of any air, which was looked upon as the cause of any trouble, or to avoid the too sudden relief of tension, which was thought to cause any internal rupture. In reality, the latter complication was brought about by entirely different causes. First, by some unduly rough exploration, or, later on, by changes taking place in the pouch, which had become friable under the influence of septicæmia. All the same, operative interference was looked upon as full of risk, and Bozer, Dupuytren, and Cazeaux were of opinion that it should not be resorted to; its adoption was again deprecated

the accumulation was evacuated spontaneously, and Desprès, basing himself upon this fact, recommends one systematically to abstain from operating. But the patient was not kept in view for more than a month, and it is not known whether the tumour reappeared, which is what probably happened.

a few years ago.* At the present moment numerous successful cases prove how harmless it is, if one proceeds boldly, using antiseptic precautions. The result is that the prognosis, when therapeutic measures are resorted to, has been radically altered.

Treatment.—1. *Total hæmatocolpos and partial hæmatometra (cervical) (atresia of the hymen or retro-hymen).*—Simple puncture, or puncture with an aspirating needle, when not followed by an incision at the same sitting, appears to be a very prudent operation, but is really a serious and risky operation. It is very likely to set up suppuration.† One ought, therefore, to begin by slowly evacuating the collection of blood by means of a very small incision, a simple puncture made with a bistoury, and thus allow the fluid slowly to flow away, in the course of half an hour or an hour. Then immediately after one should replace the puncture by a large crucial incision. It does more harm than good to excise the obturator membrane at the same time. The cavity should be thoroughly cleansed with some weak antiseptic lotion injected very gently; last of all, some iodoform gauze should be introduced into the vagina.‡

An objection has been found to this method of rapid although progressive evacuation in the danger there is of causing a rupture of the tubes when they are distended and adherent to the neighbouring parts. But, on the one hand, this distension is very rare in hæmatocolpos from obliteration in the lower part; on the other hand, the tubes run much less danger of rupturing when their walls are still intact than when one is temporising, and that a certain degree of decomposition has caused the sac itself § to become softened, and its contents to be altered.

* See on this subject Gillette. *Annal. de Gyn.*, May and July, 1874, t. 1, p. 345, and t. 2, p. 37.—J. V. Delaunay. On the transverse septum occurring in the vagina, Thesis for M.D., Paris, 1877.—Guéniot. *Bull. et Mém. de la Soc. de chir.*, 1878, p. 509 (Report on a work by Boem).

† Defontaine. On a case of imperforation of the hymen, with retention of the menstrual fluid; reported by Terrier. *Bull. et Mém. Soc. de chir.*, p. 745. This is an example of suppuration set up by a puncture.

‡ This method is recommended by Hegar and Kalténbach, Breisky, &c. It has been adopted by P. Segond. Congenital imperforation of the hymen (*Bull. et Mém. de la Soc. de chir.*, 1886, p. 840). Berger's report (*ibid.*, p. 881).

§ In Gosselin's case, which has been so frequently mentioned in connection with this subject, perforation of the tube only took place three days after the first attempt to create an artificial vagina; before that the case was probably complicated by septicæmia.

2. *Total hæmatocolpos and partial or total hæmatometra (atresia of a large portion or of the whole of the vagina).*—One has here to dissect the parts thoroughly, a very dangerous proceeding when one considers the immediate neighbourhood of the rectum and bladder. Amussat,* the first who was bold enough to propose creating an artificial vagina, allowing the immediate evacuation of the collection of blood, and then a permanent outlet for the menses, did it in several sittings, each time using prepared sponges to fill up the part which had been taken possession of. He discarded entirely the use of any cutting instrument, and merely used his fingers to separate the tissues.

At the present time it is considered preferable to do the operation at one sitting, while taking advantage of Amussat's useful directions. I have described the commencement of the operation when talking of the cases in which it was necessary to create a canal merely for the purposes of copulation, in the absence of any uterus (p. 480). When there is hæmatometra, the presence of a tumour will be of great use in helping as a guide during one's dissection. As soon as its immediate neighbourhood is reached, which is to be recognised by the rectal tactus, a trocar has to be pushed towards the point where fluctuation is felt, and when the escape of the fluid shows that the cavity has been opened, one should rapidly incise the parts on either side of the canula of the trocar, making a series of small cuts with a narrow bistoury. Breisky recommends for this a knife with its blade hidden in a canula; it is not, however, indispensable. It will afterwards be necessary to use some cylinders made of hardened gum elastic, or of glass, to maintain the calibre of the canal.

Puncture through the rectum, which has been recommended by Dubois, Boyer, Scanzoni, and Baker Brown,† should be discarded. Puncture, or incision through the bladder, as proposed by Simon‡ and Spiegelberg in the cases in which incision through the perinæum presented too many risks, is worthy of consideration. No doubt one ought to be able thus to evacuate any collection of matter which is threatening to burst without

* Amussat. Report of an operation for artificial vagina. Paris, 1835.

† Baker Brown. Surgical diseases of women, 3rd edition, p. 284.

‡ Simon. Berl. klin. Woch., 1875, No. 20, p. 268.

having to open the peritoneum. But the urine penetrating into the cavity, and the possibility of its becoming infected from the cystitis which may be set up by escape of the altered blood, constitute a real danger.

It seems to me that one might have recourse to a para-sacral or para-rectal incision in certain cases of this sort.

3. *Total hæmatometra (atresia of the cervix uteri).*—The obliteration may take place, as I have said, on the level of the external orifice, or of the internal orifice. In the latter case one should commence by dilating the cervix by applying a series of laminaria tents, and one should try and introduce a sound. If one fails, or if one is dealing with a case of obliteration of the external orifice, one should first of all make a puncture with a trocar, then use a bistoury or the scissors to enlarge the orifice of the puncture. After repeated injections of a weak antiseptic solution by means of an intra-uterine catheter, it is a good plan to fill this cavity and that of the cervix with a tampon of iodoform gauze, and to keep up this excessive dilatation for several days. After that, a glass canula, or a cross-shaped india-rubber tube may be left in the uterus for a long time. When the uterus has regained its normal dimensions, one will have to resort to curetting as a means of treating the metritis naturally resulting from the primary lesion.

4. *Lateral hæmatocolpos and lateral hæmatometra (atresia of a portion of the double genital canal).*—The whole series of lesions which I have just been describing may exist on one side only of the double genital canal. No special line of treatment needs to be mentioned here. One ought to apply those general principles which have been given.

In lateral hæmatocolpos Schröder recommends one not to excise the septum too freely, so that the penis should be unable to find its way into the vagina which was closed, and that conception should not take place on that side. Such a precaution seems to me to be useless, since the spermatic fluid can find its way through the smallest opening. On the other hand, it seems to me in every respect preferable to freely remove the division, and to transform the double vagina into a single canal.

One very serious difficulty has to be dealt with both in forming one's diagnosis and carrying out one's treatment, when

the blood has accumulated in the rudimentary horn, with a pedicle which is frequently elongated, forming a tumour which seems to be independent of the principal division of the uterus. It has been proposed to reach the collection of blood through the vagina, and Hegar has even recommended either cauterisation or incision of the cul-de-sac, followed by the introduction of an iodoform tampon placed right up against the tumour, so as to induce the early formation of adhesions. This seems to me a much more dangerous course than laparotomy followed by removal of the rudimentary horn and of the corresponding tube, which are distended with blood.* If extensive adhesions render the removal too dangerous, one should suture the pouch to the abdominal wall, empty it, and try and get it closed up by the formation of granulation tissue.†

One may also have to resort to hysterectomy in certain well-marked cases of bicornate uterus. It is then generally easy enough to make out the pedicle on a level with the cervix uteri, which has to be fixed externally. I believe that this operation should be reserved for cases in which, when dissecting the perinæum, one has not been able to reach the tumour, and to those where there is some difficulty found in evacuating the fluid, owing to its having become solidified and transformed into fibrinous masses, as in Jeannel's case.‡ Hysterectomy ought to be performed at once if one recognises this condition beforehand, or ought to follow, at the same sitting, any fruitless attempt to evacuate the vagina. It is important in fact not to continue one's manipulations through this passage for too long a time, nor to exercise such an amount of pressure as to produce the rupture of the dilated tubes. Hysterectomy has been successfully performed by John Homans§ for a case of lateral hæmatometra in a bicornate uterus.

* A case of this sort is quoted by G. Leopold. Ueber Blutansammlung in verschlossenen utero-vaginal Kanäle und die Salpingotomie (Arch. f. Gyn., 1889, Bd. 34, Heft 3, p. 371).

† Howitz. Centr. f. Gyn., 1882, p. 271.

‡ Jeannel. Bull. et Mém. de la Soc. de chir., 1887, p. 505 (reported by Berger). The patient, who died almost immediately after the operation, appears to have suffered from internal hæmorrhage, resulting from the rupture of a hæmato-salpinx brought about by some very severe manipulations lasting two hours, and some pressure exerted upon the abdomen. The tumour (bicornate uterus with left hæmatometra) was very voluminous and full of solid clots.

§ John Homans. Boston Med. and Surg. Journ., 8th Nov., 1896, t. 109, p. 496.

5. *Hæmato-salpinx*.—What is the proper course to pursue when dealing with the hæmato-salpinx which frequently complicates atresia of the genitals? It is not to be neglected, since the rupture of the tube, when changed into a thin-walled sac, has frequently caused death. Fuld* has collected 66 cases of atresia of the genital organs, both acquired and congenital, in which this accident was reported to have occurred, and 48 times it was followed by death. Out of these cases 39 were consecutive to some operation, and 9 took place before any intervention. Hæmato-salpinx was present 27 times in cases of atresia in which the genital canal was not double, and 12 times in cases where it was double.

In order to be quite able to judge of the necessity of operating, one ought to understand about the natural evolution of the fluid collected in the tube, after the evacuation of the vaginal or uterine tumour has taken place. In many cases, if care has been taken to make a sufficiently large opening for the escape of the blood and to keep it patent, the hæmato-salpinx gradually empties itself and disappears.† But there are also many cases in which the tumour in the tube does not undergo any alteration, or else, after having subsided, it reappears during the following menstrual period. It is in such cases as these that one ought to operate; salpingotomy performed in these circumstances by Sutugin‡ was most successful in its result.

Evacuation of the contents of the hæmato-salpinx by a simple puncture has been proposed; but although less important in appearance, it is really much more dangerous than excision.

* S. Fuld. Die Salpingotomie wegen Hämatosalpinx bei Gynatresie. (Arch. f. Gyn., 1889, Bd. 34, Heft 2, p. 191.)—G. Leopold. *Loc. cit.*, p. 371.

† Aman. Ein Fall von Atresia hymenalis. Hæmatocolpos, Hæmatometra, und Hæmato-salpinx (München. med. Woch., 1888, No. 52, p. 909). Spontaneous disappearance of the hæmato-salpinx after evacuation of the hæmatocolpos and the hæmatometra.

‡ Sutugin. *Wratch*, 1888, No. 24, p. 466. (Observ. 24.)—Chapman. *Edinb. Med. Journ.*, 1884-85, t. 30, p. 204.—Ferrillon. *Revue de chir.*, 1887, t. 7, p. 71, and *Bull. de therap.*, 1877, t. 113, p. 390. These surgeons, that Fuld is somewhat wrong in quoting in connection with this subject, have operated upon cases of hæmato-salpinx occurring from narrowing of the genital canal, which is acquired and not congenital. —Leopold (*loc. cit.*, p. 371) has published a case of prophylactic salpingotomy, performed in a case of bicornate uterus with a rudimentary horn, where there was hypertrophic interstitial salpingitis producing severe pain. One cannot very well reconcile these very incongruous facts.

Puncture of the vaginal culs-de-sac (Kaltenbach, Alberti, Rennert, H. Bertram, P. Müller) has been followed by success, but there is danger of wounding the intestine and the bladder, and it may be complicated by effusion of blood into the peritoneum and suppuration of the pouch. The same fault may be found with the method of puncturing through the abdominal wall (Haussmann).

There are other circumstances under which it is necessary to perform salpingotomy. These are when, after or before operating upon the vagina or the uterus affected with atresia, the tumour in the tubes is seen to suddenly collapse without the quantity of blood seen to flow externally bearing a sufficient relation to the diminution in volume. It is very probable, then, that a rupture has taken place into the peritoneum. Any alarming symptoms of internal hæmorrhage would make this certain, and show the necessity of performing laparotomy immediately.

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